SCIENCE AND INDUSTRY

for VICTORY .... Work Harder .... Stop Waste .... Buy Bonds

Contractors and Engineers Monthly

Vol. 40, No. 6 JUNE, 1943 $2 a Year, 20 Cents a Copy

Highlights Of This Issue

Speedy Concreting for Army
Well-planned batching is important to satisfactory progress on any concreting job. How this was handled for speedy completion of air-field apron paving and for the various widely scattered structures at an Ordnance Depot is described in this issue. See page 1.

Post-War Planning
Post-war construction for the aviation industry, necessitated by the expansion of both domestic and international aviation in the post-war period, is the subject of the third in our series of discussions on post-war planning. See page 2.

Roads for Victory
Although highway work generally is severely curtailed, considerable necessary work still goes on. In this issue we have described the construction of a depressed industrial access road in the site of an old canal in Ohio, hot-mix paving of service roads at an Army base, and gravel production for the Alcan Highway. See pages 2, 9 and 19.

Bridge Work
With the restrictions in the use of steel, bridge construction and repair present a difficult problem. California's method of salvaging steel from old bridges for new ones, and the use of welding in steel-bridge repair are described in this issue. See pages 7 and 22.

Earth and Rock Dam
Speedy processing of material to bring the dam above flood level before this spring was the feature of the work on a large earth and rock structure in Pennsylvania. See page 11.

Equipment Pooling
Conflicting opinions and discussion on the subject of pooling state, county, town and municipal road equipment in each state led us to an investigation of this subject. The replies from forty-five state highway departments indicate that the proposed pooling plan is not necessary. See page 26.

IN THIS ISSUE

Airports 1, 2, 29
Alcan Highway 19
Bituminous Paving 9, 29, 46
Bridges 7, 22, 51
Care of Equipment 14
Cartoons 4
Concrete Construction 1, 2
County Road Work 50
Dam Construction 10, 11
Editorial 4
Equipment Pooling 26
Gravel Production 19
Highway Financing 53, 63
Highway Maintenance 28, 30, 46
Highway Shops 40
Legal Decisions 42
News Photos 34, 35
Post-War Planning 2, 4, 5, 53, 63
Roadside Development 5, 30
Safety 23, 31
Wartime Rulings 6, 55, 61, 62

Well-Planned Batching Speeds Work for Army

Airport Apron Poured By 34-E Paver; Novel Tie-Down Forms Used at Midwest Air Field

(*Photo on page* 68)

✦ ISOLATED from adequate housing facilities for labor, so that the working hours had to be kept between 8 and 9 hours, concreting operations at a new midwest airport were speeded up to offset the shorter hours. The runways are of asphalt but the tie-down apron, where planes which cannot be housed in the single hangar are stored, is of concrete. With 900 feet as the maximum straightaway pour before a complete turnaround of all equipment was necessary, the contractor bent every effort to organize for speed in the short runs available in order to complete the job before the scheduled air forces moved in. This resulted in pouring 1,145 feet of 25-foot strip with 8-6-8-inch section in 9 hours, including the time required for the turnaround.

Batching

If the batching plant is slow, then the entire paving operation will be retarded. There was no kick at the batching plant on this job as the crane operator kept the Byers crane with its 42-foot boom and 2¼-yard Blaw-Knox Dreadnaught clamshell humming through the air to set a pace that would serve the paver to its maximum capacity. The sand and gravel

C. & E. M. Photo
A transfer station where the batches and water were delivered to truck-mixers at a Southwest Ordnance Depot.

were hauled into the site from a distance of 8 to 10 miles and stockpiled alongside the Johnson batching plant. The cement was brought in on semi-trailers a distance of 14 miles and six to eight men emptied the 8 bags per batch onto the batches as the trucks stopped at the trailer. An emergency stockpile of 300 to 400 bags of cement covered with tarpaulin was maintained at the site.

The dry batch weights for the 34-E paver were: gravel, 2,658 pounds; sand, 1,640 pounds; and cement, 8 bags. The hauling fleet consisted of four to nine two-batch trucks for the big batches.

Setting Up the Grade

The base for the concrete pavement consisted of 6 inches of crushed limestone rolled by both sheepsfoot and steel-wheel rollers to a firm foundation. On

(*Concluded on page* 6)

Dry Batches Hauled by Large Fleet of Trucks to Scattered Transfer Points At Ordnance Depot

✦ BECAUSE of the large area to be served, nearly 50 square miles, at an Ordnance Depot in the southwest, the question of delay in delivery of concrete for various storage structures was a matter of concern. If the concrete were mixed at a central plant, the distances would be too long for hauling by agitator trucks, and the same difficulty would have had to be faced in using truck mixers from a central plant, in addition to the extra investment for the truck-mixer units over dump trucks. The use of a fleet of 5 to 40 one-batch trucks hauling weighed dry batches from a central batching plant to transfer stations located from 2 to 4 miles distant and there dumping through hoppers to 4-cubic yard transit-mix trucks solved the time-haul problem perfectly.

The Dry-Batch Plant

It was the original plan to use exclusively crushed Malapai rock from quarries just off the reservation, a 6-mile haul, but the plant set up for this purpose was unable to produce at the rate required so up to 15 cars of crushed stone were imported daily. Sand for the job was hauled 30 miles in 32-yard trailer trucks and delivered to stockpiles over a 125-foot tunnel. The three aggregates, sand, ¾-inch crushed stone, and 1½-inch stone, were all handled in the same manner.

A 125-foot belt 36 inches wide was installed in the tunnel to bring out the required aggregate as the tunnel gates were opened and deliver the stone or sand to the conveyor belt 300 feet long between centers and also a 36-inch belt. The conveyor belt carried the aggregates to the top of the plant where a hopper and revolving chute delivered the material to the proper bin. Each of the belts had its separate electric drive.

Bulk cement was delivered in box cars at the two ends of the 125 x 40-foot cement storage house built up of 2 x 8-inch lumber laid flat. The cement was delivered to the spiral conveyors by automatic scoops operated by two men in each car with a third hand-shoveling to clean out the corners. The spiral conveyors carried the cement to a bucket elevator at one end of the building where it was raised to a steel feeder box which delivered the cement to a small steel silo, keeping that full at all times for the

(*Concluded on page* 39)

STREAM OF EARTH BUILDS STURDY DAM

U. S. E. D. Photo
General view of Youghiogheny Dam site from the processing plant. See page 11.

Post-War Construction For Aviation Industry

International Aviation Faces Problems of Bases And Policing; Vast Program Of Construction Ahead

✦ AVIATION, a great industry in pre-war days, now strides ahead as a result of its Herculean transportation task during the war. North America has been linked by transport planes with the farthest inhabited portions of the two Americas. England, North Africa and the ports of the Pacific have been brought close to our shores by the newest man-made birds. The airplane made possible Wendell Willkie's remarkable trip to distant places to learn the thoughts and problems of the United Nations leaders in the far-flung reaches of the world. His description in "One World" of the city of Yakutsk, over 1,000 miles from the nearest railroad, yet a modern, thriving community, strikingly highlights the importance of air transport.

During these past two years remarkable construction, reported as yet only in general terms, has taken place in South America, Africa (C. & E. M., May, 1943, pg. 42) and elsewhere to create new airports for the transport planes that have ferried important personnel, vital war materials, and valuable documents from one continent to another. These airports are small bases compared to those which will be built after this war is successfully concluded by the United Nations, thus opening another great field of construction activity for the contractors of the world.

Aviation Spreads Its Wings

Juan T. Trippe, President of Pan-American Airways, has stated that our aircraft industry could begin today, without further experiment, the construction of super-transport airships so large that two hundred of them could carry half-a-million people to Europe every month. These liners of the air could provide 24-hour service from this country to Chungking, China, or to Sidney, Australia, or 10-hour service east to London. Translating these into military values, Mr. Trippe pointed out at the New York *Herald-Tribune* Forum

(*Continued on page* 54)

Pan American Airways Photo

Rapid strides have been made in transportation since the days of the clipper ships at sea. Post-war aviation will make even greater advances, linking the world's farthest points.

Domestic Aviation Will Expand Passenger-Express Service; Terminal Facilities To Be Planned and Built

✦ THE planning and development of airport facilities within the United States is of the utmost importance if we are to meet the demands for rapid movement of passengers, express, and freight after the war. The present CAA program for developing 4,000 airports is but a beginning in meeting the future need for air terminals. Further, it covers only ground construction and so must be followed by

(*Continued on page* 20)

The Present and Post-War Value of Flight Strips On American Highways; Their International Character

✦ BEFORE World War II, Flight Strips were a theory, a most desirable safety factor in aviation, but their development had not reached the stage of construction. Since the beginning of hostilities in Europe, plans were quickly developed, through the cooperation of the Public Roads Administration and the various state highway departments, so that Flight Strips are now well distributed throughout the United States.

Recently, Thomas H. MacDonald, Commissioner of Public Roads, reported that the first Flight Strip, completed a year ago on the southeast coast, saved an Army bomber. The bomber was hemmed in by storms and received reports that low ceilings closed every airport within safe flying distance. Having reports on the recent completion of a Flight Strip 30 miles away, the pilot set his course in that direction, found the area open and made a safe landing, saving ship and crew. A similar incident is reported from the Pacific Coast, and between 10 and 15 emergency landings have already been made on other landing strips. "Loss of either of the planes in the two instances I have cited," Commissioner MacDonald said, "would have cost the government almost as much as the Flight Strip cost, to say nothing of the priceless loss of trained men."

Flight Strips have been referred to as "bargain-counter airports" with only one runway, but that single runway is constructed like those at first-class airports. Henderson Field at Guadalcanal is nothing more than a Flight Strip, and the airports reported along the Alcan Highway are also Flight Strips.

Flight Strips have averaged less than $500,000 each for land, engineering, materials, construction and contingencies, and the use of materials listed as critical by the War Production Board has been less than 1 per cent of the total cost.

The more than a score of Flight Strips that have been completed or are now under construction, and others in the planning stage, will meet the needs of war, and will be of continuing usefulness to civil flyers, both commercial and private, after the war.

International Program

The Flight Strip program is also becoming internationalized. Started in this country as an aid to commercial flying, the Flight Strip principle has been accepted overseas for its great military value for the dispersion of aircraft. When the United States became one of the United Nations, an impetus was given to the construction of Flight Strips in North America for military purposes because of their economy, speed of construction, and their contribution to the safety of military flying.

The Canadian Government has sent engineers to this country to study our Flight Strips and adapt them for use in the Dominion, in addition to the programs of this country along the Alcan Highway. Now the republics of Central and South America are planning the development of their own chain of government-owned and controlled Flight Strips along the Pan-American Highway for commercial flying to augment and supplement the privately owned air fields of commercial aviation through South America.

These auxiliary landing areas adjacent to the Pan-American Highway are doubly important today. They serve to increase the safety of the vital air-borne traffic of critical materials being shipped both north and south. Secondly, the Chiefs of Staff of the Latin-American nations feel that greater national security is created by the existence of these auxiliary aviation facilities during the period of the emergency.

The Flight Strip program was first presented to the Latin-American republics at the fourth Pan-American Highway Congress in Mexico City on September 15, 1941, and was well received. The Mexican Government has already started the selection of sites and the consideration of its policy in carrying out the program.

To speed the initial program of Flight Strip construction in Central and South America, the United States is turning over standard plans and specifications as rapidly as agreements are made and the authorities in each country have chosen the sites. The agreements will probably include financial aid for the work at the start because of the great immediate commercial value of the Flight Strip in Inter-American trade involving essential war materials. Contracts will probably be awarded to the same contractors who are pushing through the last of the pioneer roads to link the completed sections of the Inter-American Highway in Central America.

In this country, the individual states have been the agents of the Federal government in carrying out the nation-wide Flight Strip program, while in the Lat-

(*Concluded on page* 31)

A New Access Road To Industrial Plant

Old Miami and Erie Canal Converted to a Depressed Roadway with Overheads And High Retaining Walls

(*Photos on page* 68)

✦ WORK progressed rapidly on a 2.214-mile project, DA-WI-7A, 1-2-3, Access, to provide dual 24-foot depressed roadways along the site of the old Miami and Erie Canal at Lockland, Ohio. Three overhead structures to carry traffic over the new industrial access road, with some local entrances, and a channel change for Mill Creek were also included in the $1,059,745.63 contract awarded to the Byrnes-Conway Co. of St. Bernard, Ohio. Accelerating and decelerating lanes 12 feet wide, diminished to 2 feet where traffic enters the main highway, are provided at all entrances to the new roadway, which is divided at the center by a 4-foot mall. For a portion of the project where the roadway is not depressed, 14-foot service roads are provided at either side for local traffic.

At Wyoming Avenue the through highway is crossed by an 83-foot roadway with street railway tracks and sidewalk. This overpass bridge was designed as a plate-girder structure but was changed to a concrete-beam bridge to save steel. North of Wyoming Avenue is a pedestrian bridge for school children and just south is the Lock Street Bridge. South of this, Mill Creek formerly crossed the right-of-way but has been diverted to the southeast.

Excavation

The excavation on this project, amounting to 213,250 cubic yards, included almost no rock. The material ran from a pure yellow sand to gravel and canal muck and trash in the 25 to 28 feet of excavation. The contractor used a Lorain 75-A, a Bucyrus-Erie 1½-yard shovel and a P & H ¾-yard shovel loading to six 7-yard Insley wagons and a fleet of 25 to 30 trucks. Aiding the shovels was a Caterpillar D6 with a La-Plant-Choate bulldozer.

Retaining Walls

Gravity-section retaining walls on either side of the depressed roadway average 32 feet in height with no steel except where the wall is over 26 feet in height and then only in the footing. The walls are battered 1/16 inch per foot in front and have a variable batter in back up to 4 inches per foot. An 18-inch porous backfill of slag was placed against the back of the wall, with 8-inch drain pipe laid with open joints at the bottom. The 18-inch top of the wall is sloped ¼ inch toward the back to prevent water

(*Continued on page* 16)

C. & E. M. Photo

Job-cut tie rods for retaining-wall forms were threaded on this Beaver Model C, saving time and money for Byrnes-Conway on their Lockland, Ohio, access road job.

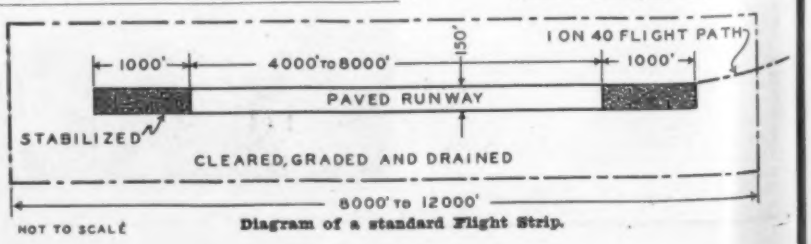


Diagram of a standard Flight Strip.

Your post-war road or street program

A series of advertisements pointing out how TEXACO Asphaltic products can fit into your program

#3

COLD PLANT-MIX PAVING with TEXACO LIQUID ASPHALT

Laying TEXACO "Cold-mix" on a Michigan highway and the completed pavement ready for traffic.

Let's look briefly at "Cold-mix" TEXACO Asphalt paving—what it is—why it is attractive to the road builder.

The use of TEXACO Liquid Asphalts (Cut-backs, Slow-curing Oils, Emulsions) makes possible the plant-mixing of asphalt and aggregate with little, or no heat. A simple, easily moved plant, therefore, will produce an entirely satisfactory mix.

Inexpensive local aggregates, often unsuitable for hot-mix, due to the presence of clay or other unsuitable materials or because they break down under heat, can be used in TEXACO "Cold-mix".

TEXACO "Cold-mix" retains its plasticity after long hauls from plant to distant jobs. Depending upon the aggregate used, it can be laid to any required thickness, from ½ to 3½ inches.

Use of TEXACO "Cold-mix" allows traffic the uninterrupted use of road or street during construction. Half the pavement can be laid at a time, and it is ready for traffic immediately after the mix is spread and rolled.

TEXACO "Cold-mix" paving has served for years under heavy traffic. Maintenance cost is low, consisting of a light seal coat after long intervals of service.

Investigate the possibility of using your local aggregate by the TEXACO "Cold-mix" method when you plan your post-war road or street program.

THE TEXAS COMPANY, *Asphalt Sales Dept.*, 135 East 42nd St., New York City

Boston Philadelphia Richmond Chicago Houston Jacksonville

TEXACO REG. T. M.

TEXACO ASPHALT

Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING
CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS

Member of Controlled Circulation Audit

Issued Monthly by Buttenheim-Dix Publishing Corp.
Editorial and Business Office: 470 Fourth Ave., New York City

Acceptance under the Act of June 5, 1934, authorized January 28, 1943
Printed in Mount Morris, Ill., U. S. A.

THEODORE REED KENDALL.....Editor — O. E. POTTER.....Managing Editor
EDGAR J. BUTTENHEIM.....President — DONALD V. BUTTENHEIM.....General Manager
GEORGE S. CONOVER.....Vice President — HERBERT K. SAXE.....Treasurer
MYRON MacLEOD*.....Advertising Manager

BRANCH OFFICES
Chicago, Ill., Daily News Bldg., George S. Conover, Vice President; John T. Dix*.
San Francisco, Calif., Mills Bldg., and Los Angeles, Calif., Western Pacific Bldg., Duncan A. Scott & Co.
* On leave of absence for military duty.

Copyright 1943 by Buttenheim-Dix Publishing Corp.

What Are Expansion Joints?

You have all heard the yarn about the man who told his new English friend that he was "going home to Yonkers", leading the puzzled Englishman to inquire "What are Yonkers?". The performances of some expansion joints we have inspected, a blow-up of a concrete pavement 50 feet ahead of us near Wausau, Wis., a few years ago, and the threatened elimination of expansion joints by some states, all lead us to vary the Englishman's query to "What are expansion joints?".

Are we still in the dark ages regarding expansion joints? We are of the opinion that at least we are in the twilight. We seem to have solved the problem of load transfer adequately, but the transverse ¾-inch or 1-inch space that we leave and refer to as "the expansion joint" between slabs is still a problem.

This was brought up for discussion by an examination of a series of joints during an inspection trip in Arizona when we traveled over a new widened section of U.S. 60-70-80-89, 4 miles east of Mesa, Ariz. The expansion joints here were spaced 60 feet apart and the contraction joints 15 feet apart. The pavement had been laid in two sections, the first with a premoulded extruding type of joint material ¾ inch wide and set ¼ inch below the top of the pavement. A little farther along on the same pavement a redwood plank ¾ inch thick was used in place of the extruding-type joint material and set in the same manner. Since that time the specifications have been changed and the redwood is now set flush with the surface of the pavement. These sections of pavement were laid in all kinds of weather and no special log was kept of the variations of weather between the sections laid with the different types of expansion-joint material. But they have acted uniformly differently.

Where the extruding-type joints were used, the contraction joints have opened up and the expansion joints are under compression, as shown by the continued extrusion of the premoulded material. The expansion evidently took place after the contraction that opened the contraction joints, but the expansion did not close the contraction joints. Thus they have been left open to accumulate dirt and continue to make the pavement "grow".

The section where the redwood joint was used shows all the contraction joints closed and the plank under compression as the concrete is still tight against it. The question raised is whether the more solid type of expansion-joint material is justified by the fact that it has acted to close the contraction joints that had opened and then closed due to the changes in temperature.

Some states will jump right in and declare that they have done away with expansion joints entirely. Arizona has increased the spacing to 120 feet but has not completely overthrown the expansion-joint idea. In that state they have pavement temperatures as high as 145 degrees in summer, while the temperature goes down to freezing in winter. That is not as great as the span in Michigan, for instance, where the winter temperatures drop to well below zero in some sections. Again Arizona has many miles of pavement which were laid at a time when it was the "fad" to omit expansion joints as a saving in construction cost and there have been no blows on those sections.

We ask you, "What are expansion joints?". It would seem that it is a problem still to be studied and that at this time, when highway construction is at a low ebb, the Highway Research Board and its associated groups might well make an intensive study of the successes and failures of expansion and contraction joints for use as soon as the paving industry rebounds after the war has been successfully concluded.

Post-War Series

Continuing our series of articles on Post-War Planning, our next issue will contain a discussion of plans for irrigation, flood control, and public utilities after the war. Subsequent articles will cover housing, recreation, railroads and communications, municipal utilities, and foreign construction.

Letters to Editor On Post-War Article

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

Thank you kindly for your letter of April 20, 1943, enclosing a copy of the April issue of CONTRACTORS AND ENGINEERS MONTHLY containing an editorial on the necessity for post-war planning in which you quote from a recent address of mine concerning the need for reducing excessive trade barriers.

I appreciate your thoughtfulness in bringing this article to my attention. I found it to be both a stimulating and penetrating analysis of our tremendous stake in the post-war reconstruction task which will confront us once the military victory is won. It will be a long and difficult task, but one of the things which gives me confidence that it will be done and done well is the active and intelligent attention which spokesmen of business groups, such as yourself, are giving the matter.

I noticed that in the fourth paragraph of your editorial you say that we can have peace if the people are willing "to make the sacrifices for it which they will make for war". I understand fully what you mean, but I think you would agree with me that if we will only resolutely pursue policies which make peace possible we shall find that very little, if any, real sacrifice is involved. In truth, I believe the international economic policies which are necessary to this end involve great opportunity rather than sacrifice for us and the other nations of the world.

Sincerely yours,
Francis B. Sayre,
Special Assistant to
the Secretary of State
Washington, D. C.
May 8, 1943

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

I was much interested in reading your editorial and article on post-war planning in your April issue. There can be no doubt of the vital necessity of planning now for the post-war period. Your article showed a comprehensive grasp of the manifold problems that will confront the world in attempting to build a lasting peace upon the sorry remains of our pre-war civilization. It will certainly tax human powers to the limit and the hope of success will be slight if a start is not made now.

"Now right there, fellows, I don't think you've quite captured the idea!"

There is need for constant pounding on the idea of planning and your series of articles should be extremely worth while.

I think almost everyone agrees on the need, but to crystallize the thought into action so that some definite individual persons having the necessary knowledge and ability are put to work on bites that they can chew will take constant pushing. I presume that your later articles will take up specific segments of the job in which contractors and engineers should be interested.

Yours truly,
Roy W. Crum, Director
Highway Research Board
Washington, D. C.
April 28, 1943.

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

I have been reading the editorial entitled "Post-War Planning, A 'Must' for Today" appearing in the April issue of your valuable publication. There is nothing to show who wrote this splendid article but whoever it was presented a bang-up argument. I might add that them's my sentiments too. I would like to see that editorial put in pamphlet form and copies mailed to every Senator and Congressman. Coming as it does from a source representing the field of construction, it presents an opinion not often sought by those who control our international policy—and more's the pity.

While it is true that at the present moment, our "isolationists" have been temporarily (at least) converted, or have run for cover, nevertheless I am persuaded they will raise their ugly heads again at the first opportune moment offering political or personal advantage. It is therefore necessary to put up a constant fight for those principles of international justice which alone can make for permanent peace, and which transcend petty politics, personal ambitions, and narrow selfish nationalism.

These "isolationists" made a political football of the League of Nations Covenant. Granting that this great document was far from perfect, nevertheless the spirit of cooperation and experience gained in administering same would have eventually made it a safe workable instrument.

We were invited and urged to assist in remedying these imperfections on practically our own terms. How did these isolationists respond? By turning a deaf ear to the invitation, by magnifying these defects, and by twisting and ridiculing all that was good in the only plan that held any hope of saving the world from its present misery. They were convinced and are still convinced we could withdraw behind our own boundaries and self-sufficiency and let the rest of the world stew in its own juice.

With best wishes, I am
Sincerely,
Leonard H. Bailey,
Associated Architects & Engineers
Oklahoma City, Okla.
April 22, 1943

FLYING THEM ALL TO THE SAME DESTINATION

Buy War Bonds regularly!

Present-Day Action And Post-War Plans

Maryland Roads Commission Backed By Civic Groups Cleans Up Signs On Roadsides; Prepares for Future

By S. W. BAUMILLER, Landscape Engineer, Maryland State Roads Commission

♦ IT has been reported that the State Roads Commission of Maryland is dismantling and removing all abandoned unsightly roadside structures along its highways. Unfortunately, the Commission has not the authority to do this, but it does have authority to remove abandoned billboards or other similar structures, signs, posters, or display advertising of any kind outside of the corporate limits of any city, town, or village, and within 500 feet of any public highway within the state. Surveys of roadside advertising signs are made periodically, all structures which do not meet State regulations are listed, and the lists given to the roadside clean-up crews for the removal of the signs.

Advertising without permits is allowed along Maryland highways within 100 feet of the place of business where the product advertised is for sale. If the place of business is vacated or abandoned, the privilege of advertising within the 100-foot radius of the business place, and the advertising on the building itself, becomes void, and the signs can be removed.

Maryland civic organizations are very active in urging property owners to keep their places of business in order. This is especially true of the National Roadside Council and the Maryland Federated Garden Clubs. These organizations appeal to the property owners and as a result, in a great many cases, their cooperation has been secured. When the owner of an unsightly structure does not cooperate with the State Roads Commission, and if the right-of-way is sufficiently wide, a screen of plant material is sometimes set up. The Commission, in many instances, has refused entrance permits to prospective builders where it is considered that these entrances to the highways would be a hazard to the traveling public. In other cases, on relocated highways, permits have been refused to property owners who have adequate access to the old highway.

Results of War Conditions

The war has favored roadside development engineers insofar as the automobile graveyards are concerned as they are fast disappearing from our roadsides due to the metal scrap drives. This condition of unsightly scrap heaps or auto graveyards should never be permitted to reoccur, especially within sight of our main highways.

Numerous business places, especially gasoline stations, have been abandoned because of tire and gasoline shortages. Many of these buildings are unsightly and some are located along our mountain roads at the very peak of the mountain ridges. It would be feasible at this time for the State to purchase these properties and plan to construct in their place, after the war, park areas, scenic outlooks, and approved service structures under the control of the State Roads Commission. These ideas and suggestions are being incorporated in the post-war plans for the development of Maryland roadsides.

New Athey Supervisor Of Service and Parts

Announcement has been made by the Athey Truss Wheel Co., Chicago, Ill., of the promotion of Claude E. Matthews to the position of Supervisor of Service and Parts. Mr. Matthews has been with the company since 1937 and has had broad contact with its distributors.

WHEN YOU NEED HELP

Call on These Earthmoving Specialists—

Your LeTourneau-"Caterpillar" Distributors

YOUR LeTourneau-"Caterpillar" dealer grew up with earthmoving equipment . . . he has worked with you and the factory to build an organization of specialists in the use and service of LeTourneau equipment and "Caterpillar" tractors.

Your demand for the cost-cutting combination of LeTourneau equipment and "Caterpillar" tractors has made possible 186 dealers and branches in United States alone. That means small, easy-to-cover territories . . . better, faster service for you. The average distance between these dealers is only 185 miles . . . so you are probably less than 93 miles, at most 2 or 3 hours, from a dealer's parts and service headquarters.

Whenever you need parts and repair service—or priorities information—call the nearest LeTourneau-"Caterpillar" dealer . . . he's listed below.

ALABAMA
Burford-Toothaker Tractor Company, Montgomery.
J. D. Pittman Tractor Co., Inc., Birmingham, Decatur.
ARIZONA
Hartnett & Sanders Tractor Co., Yuma.
State Tractor & Equipment Co., Phoenix, Buckeye, Coolidge, Mesa.
ARKANSAS
J. A. Riggs Tractor Co., Little Rock, West Memphis.
CALIFORNIA
Berglund Tractor & Equipment Co., Napa, Dixon, Rio Vista, Santa Rosa.
Brizard Tractor & Equipment Co., Arcata.
Budd & Quinn, Fresno, Madera.
Cornell Tractor Co., Salinas, Watsonville, King City.
Cousins Tractor Company, Hanford, Bakersfield, Wasco.
Faure Tractor & Equipment Co., El Centro, Brawley.
Halton Tractor Co., Merced, Los Banos.
Holt Bros., Stockton, Lodi.
Johnson Tractor Company, Riverside.
Marysville Tractor & Equip. Co., Marysville.
Joseph G. Moore Company, Santa Maria, Paso Robles, Goleta, Lompoc.
Peterson Tractor & Equipment Company, Hayward, San Francisco, Brentwood.
Rye Tractor & Equip. Company, San Jose, Hollister.
San Diego Tractor & Equipment Company, San Diego, Escondido.
Shepherd Tractor & Equipment Company, Los Angeles, Oxnard, Covina, Santa Ana.
Sierra Tractor & Equipment Company, Chico, Gridley, Redding, Red Bluff.
Treanor Equipment Co., Visalia, Porterville, Tulare.
Valley Tractor & Equipment Company, Modesto.
Weaver Tractor Company, Sacramento, Woodland.
I. G. Zumwalt Company, Colusa, Willows.
COLORADO
Clinton & Held Company, Denver.
CONNECTICUT
The Nicoll-Talcott Corporation, Hartford.
FLORIDA
Burgman Tractor-Equipment Co., Jacksonville.
Clewiston Motor Company, Clewiston.
Shelley Tractor & Equipment Co., Miami.
GEORGIA
Yancey Brothers Co., Atlanta.
Yancey Tractor Company, Albany.
IDAHO
Bunting Tractor Company, Boise, Twin Falls.
Nez Perce Tractor & Equipment Co. Lewiston.
Westmont Tractor & Equipment Company, Idaho Falls.
ILLINOIS
Central Illinois Tractor & Equip. Co., Springfield.
Fabick Tractor Company, Salem.
John Fabick Tractor Co., Marion.
Patten Tractor & Equipment Company, Chicago.
Peoria Tractor & Equipment Company, Peoria.
INDIANA
Indiana Equipment Company, Inc., Indianapolis.
IOWA
Gibbs-Cook Tr. & Equip. Co., Des Moines, Mason City.
Martin-Rossa Tractor & Equipment Co., Cedar Rapids.
Miller-Hasselbalch Company, Sioux City.
KANSAS
Foley Tractor Company, Wichita.
Martin Tractor Company, Topeka, Chanute.
Oehlert Tractor & Equipment Company, Salina, Colby.
Roberts Tractor & Equipment Co., Dodge City.
KENTUCKY
Roy C. Whayne Supply Company, Louisville, Paducah.
LOUISIANA
Louisiana Tractor & Mach. Co., Baton Rouge, Monroe.
MAINE
Eastern Tractor & Equipment Co., Portland.
MARYLAND
Alban Tractor Company, Inc., Baltimore.
MASSACHUSETTS
P. I. Perkins Company, Boston.
MICHIGAN
Brebner-Sinz Machinery Company, Inc., Marquette.
Michigan Tractor & Machinery Co., Inc., Detroit, Grand Rapids.
MINNESOTA
Wm. H. Ziegler Company, Inc., Minneapolis, Crookston, Duluth.
MISSISSIPPI
Mississippi Tractor & Equipment Co., Jackson.
MISSOURI
John Fabick Tr. Co., St. Louis.
Fabick Bros. Equipment Co., Sikeston.
Hobson-McFarland Tractor Company, Kansas City, St. Joseph, Trenton.
E. A. Martin Machinery Company, Joplin, Springfield.
Martin-Rossa Tractor & Equipment Co., Hannibal.
MONTANA
Connelly Machinery Company, Billings, Great Falls.
Tractor & Equipment Company, Sidney.
Westmont Tractor & Equipment Co., Missoula.
NEBRASKA
Lincoln Road Equipment Company, Lincoln.
Miller-Hasselbalch Company, Omaha.
Nebraska Machinery Co., North Platte, Scottsbluff.
NEVADA
James Cashman, Las Vegas.
Sanford Tractor & Equipment Co., Reno, Elko, Lovelock.
NEW HAMPSHIRE
P. I. Perkins Company, West Lebanon.
NEW JERSEY
Smith Tractor & Equipment Company, Inc., Irvington.
NEW MEXICO
R. L. Harrison Company, Albuquerque.
NEW YORK
Vincent S. Jerry, Plattsburg.
H. O. Penn Machinery Company, New York, Poughkeepsie, Mineola, L. I.
T. Southworth Tractor & Machinery Company, Albany.
Syracuse Supply Company, Syracuse, Buffalo, Rochester.
NORTH CAROLINA
Carolina Tractor & Equip. Co., Salisbury, Raleigh.
NORTH DAKOTA
Dakota Tractor & Equip. Co., Fargo.
OHIO
Taylor Tractor Company, Inc., The, Columbus.
OKLAHOMA
Southwest Machinery Company, Oklahoma City, Tulsa.
OREGON
Braden-Bell Tractor & Equipment Co., Pendleton, Athena, Heppner, Arlington.
Bunting Tractor Company, Inc., La Grande.
Interstate Tr. & Equip. Co., Portland, Eugene.
Reed Tractor & Equipment Company, Klamath Falls.
PENNSYLVANIA
Beckwith Machinery Company, Pittsburgh, Bradford, Harrisburg, Wilkes-Barre.
Giles & Ransome, Philadelphia.
SOUTH CAROLINA
Jeff Hunt Road Mach. Co., Columbia.
SOUTH DAKOTA
Western Material Company, Sioux Falls, Rapid City.
TENNESSEE
R. L. Harris, Inc., Knoxville.
McCarthy, Jones & Woodard, Nashville.
Taylor Machinery Company, Memphis.
TEXAS
R. B. George Co., Amarillo, Lubbock.
R. B. George Equipment Company, Dallas, Abilene.
Gulf Tractor & Equipment Company, Houston.
Wm. K. Holt Machinery Company, San Antonio, Weslaco, Corpus Christi.
Tri-State Equipment Co., El Paso.
UTAH
Landes Tractor & Equipment Company, Salt Lake City.
VIRGINIA
Virginia Tractor Company, Inc., Richmond, Roanoke.
WASHINGTON
Braden-Bell Tractor & Equipment Company, Walla Walla.
Hofius-Ferris Equipment Company, Spokane.
Northern Commercial Company, Seattle.
Webb Tractor & Equipment Company, Yakima, Wenatchee, Connell, Waterville, Ellensburg, Moses Lake, Chehalis.
Western Tractor & Equipment Company, Seattle.
WEST VIRGINIA
West Virginia Tractor & Equipment Co., Charleston, Clarksburg.
WISCONSIN
Brebner-Sinz Machinery Company, Inc., Green Bay.
Nagle-Hart Tractor & Equipment Company, Madison, Milwaukee, Eau Claire.
WYOMING
Wortham Machinery Company, Cheyenne, Sheridan, Greybull.
ALASKA
Northern Commercial Company, Fairbanks, Anchorage, Nome, Gulkana, Whitehorse.
HAWAII
Theo. H. Davies & Co., Ltd., Honolulu, Hilo, T.H.

For REPAIR and REPLACEMENT Use Tournaweld and Tournarope

Made by Men Who Best Know the Welding and Cable Needs of Earthmovers

R. G. LeTourneau began repairing construction equipment by welding as early as 1919. Soon was building his own contracting tools with welding rod and steel, has used that method of fabrication exclusively ever since. Not content with conventional rod, he began manufacturing Tournaweld (in 1940), developed especially for the specific steels and welding requirements of LeTourneau earthmoving equipment. Today, Tournaweld is made in 7 different types and a variety of sizes to provide a right rod for every construction and repair need on LeTourneau equipment.

LeTourneau first built a cable-operated Scraper back in 1928. Since then more than 30,000 LeTourneau Power Control Units for the cable operation of earthmoving units have been built. Result: LeTourneau has a cable-operation experience unequalled in the tractor equipment field. From that experience we have developed Tournarope, a long-wearing, preformed wire rope, made in our own factory, expressly for earthmoving use. Standard for 2½ years on all new LeTourneau equipment. Available in 6 sizes—⅜", ½", 9/16", ⅝", ¾" and ⅞"—for replacement use.

Both long-wearing Tournarope and specially-made Tournaweld are sold exclusively by LeTourneau-"Caterpillar" dealers, subject to WPB limitations. See your dealer for priority requirements NOW.

Well equipped machine shops and especially designed equipment and tools assure you better and faster repair work from LeTourneau-"Caterpillar" dealers. 80% of all LeTourneau-"Caterpillar" dealers have portable welding equipment, thus are able to reduce your down time by making many repairs right on the job.

To Keep Both Old And New Operating Profitably, Use LeTourneau-"Caterpillar" Distributor Service

ARMY E NAVY

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Paving Concrete Apron At Midwest Air Field

(*Continued from page* 1)

this, after grading with an Allis-Chalmers Speed Patrol, the 8-6-8-inch section concrete slab was poured. The thickened edge was carried in for a full 3 feet from the forms.

The form trench was cut by a Ted Carr Formgrader and then three men followed up and did the hand trimming ahead of the form setting. The 9-inch Blaw-Knox steel forms were set with a 1 x 3-inch wood key to tie in the alternate slabs. Four men with two laborers were used to set the forms, with one form liner and two helpers following behind for the final touches. The forms were greased by spraying with oil.

The Steel and Ties

A longitudinal plane of weakness for the control of cracking was created by the installation of a center joint of steel with ½-inch round deformed bars 30 inches long spaced 30 inches apart on welded wire chairs. These were set by the two steel men who also set the tie-down bars at 30-foot intervals. These consisted of bent bars with 2-foot legs imbedded in the concrete and the loop coming up almost flush with the surface of the apron.

Expansion joints with load-transfer dowels and impregnated joint material ¾-inch thick were inserted at 120-foot intervals. The 25-foot wide expansion-joint material had twelve ¾-inch round dowels 18 inches long, capped and greased at alternate ends. To insure a firm vertical joint, the joint material with its equal-leg cap was supported during pouring by six pairs of steel pins driven into the subgrade.

Pour Alternate Slabs

The apron was poured in alternate 25-foot slabs with keys in the sides to insure the close bonding of adjacent slabs. Ahead of the paver, the foreman sprinkled the grade in the hot summer sun to prevent the earth taking water away from the designed batch. The Koehring 34-E paver ran outside the slab being poured and then, when the first alternate set had been completed, ran on the concrete. The twin-door bucket of the paver delivered the concrete in front of a Jaeger spiral spreader which picked up the material and laid it across the subgrade in a uniform layer. The mixing time for the concrete was 34 seconds in the first drum of the paver and 27 seconds in the second. Two water trucks were used to provide water for the paver. One truck carried two 800-gallon tanks while the other mounted a 1,000-gallon tank. Each truck had a small self-priming pump for delivery of the water to the paver. A pair of Mall vibrators, one on either side, were used to vibrate along both sides of the center joint, along the forms, and on both sides of the expansion joints to insure a dense concrete throughout. Four puddlers were used with two extra men to carry back concrete to the finishing machine, a Koehring longitudinal finisher. This is one of the few instances that no other type of finishing machine was used between the spreader and the longitudinal finisher.

Finishing and Curing

Immediately behind the longitudinal finisher, the slab was checked with two 10-foot aluminum straight-edges. A Heltzel machine cut the contraction or dummy joints every 15 feet and a 1½ x ⅜-inch steel bar was inserted. This was pulled by the hand finishers at the same time as the expansion-joint caps were pulled and the sides of the joints edged. Both slots were poured with joint compound within 5 or 6 days.

After the checking with the straight-edge, an arched canvas belt was pulled over the surface and then the six hand finishers went to work on the joints and the edges. The finishers used a novel form for the hole for the tie-downs. A length of 1½-inch rubber hose was run through the loop of the tie-down and held up with a heavy wire. This served as a form for the hole which was finished by hand and then the disturbed area of concrete around the tie-down was hand-floated.

The final operation was the membrane cure with a spray of Aquastatic. This watery material is reddish in color when first applied which aids in noting the uniformity of coverage, and then it turns colorless, leaving a glossy surface as it seals the concrete against the loss of water during the curing period.

Personnel

The paving of this tie-down apron at a midwest air field was done by contract under the direction of the U. S. Engineer Department. In the interest of national security, mention of the location of and personnel connected with U. S. Army construction is omitted.

Special Ration Stamps Issued for Safety Shoes

An amendment to the original OPA Shoe Rationing Regulation now makes steel-toe safety shoes readily available to every industrial employee who needs them. Under the original regulation, it was necessary for an employee not only to spend his own No. 17 coupon but also any available family coupon in order to get a pair of safety shoes. If these coupons had been spent on other shoes, it was necessary for the worker to apply to his local War Price and Rationing Board for a special Shoe Stamp. As a result, the sale of safety shoes, particularly to thousands of new workers, dropped sharply, and toe and foot injuries began to increase at an alarming rate. Had this situation continued, a serious loss in man-hours and war production would have resulted from such injuries.

Under the new regulation, employers can appoint a representative or committee to take applications for safety shoes from employees and to issue special Safety Shoe Stamps in the plant or on the job. This appointment must have the approval of the OPA District Office, which issues the stamps to the employer. Any worker who has spent his Shoe Stamp and who has less than two pairs of wearable or repairable safety shoes may apply for these special stamps.

Construction Drops Off

Government-financed war construction, according to preliminary estimates, totaled $1,127,000,000 in March, which was 4 per cent less than the revised February total of $1,170,000,000. The decline took place primarily in industrial facilities, which dropped from $562,000,000 to $530,000,000. Military construction, war housing and community facilities declined from $608,000,000 to $597,000,000, according to the Office of War Information.

THIS "Cat" and "Carrimor" rig is rushing work on a 1,500,000 cu. yd. job of clearing, filling, leveling virgin acreage for the use of flying personnel for our Armed Forces. This job is typical of the many kinds of war construction work being performed with speed and skill by modern earth-moving equipment.

To assure long life and a minimum of service interruptions not only of "Cats" and "Carrimors," but of trucks, shovels, bulldozers, and other equipment, contractors everywhere are lubricating the bearings of their equipment with *Texaco Marfak*.

Texaco Marfak provides a tough, adhesive-cohesive film that clings to metal, resisting the severest rain and road splash.

The reason behind *Marfak's* longer-lasting protection is this – while it liquefies inside a bearing, providing liquid film lubrication, it maintains its original consistency at the outer edges, thus sealing itself in while sealing out dirt, grit, water.

For wheel bearings, use *Texaco Marfak Heavy Duty*. It stays in the bearings – off the brakes – winter and summer.

So effective have Texaco lubricants proved that they are definitely preferred in many other important fields, a few of which are listed opposite.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York, N. Y.

TEXACO

TEXACO

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CB

Highway Work Part Of Progress in Peru

Highways are playing a major part in forward-looking economic movement in Peru, according to a recent report in *Foreign Commerce Weekly*. Plans for an extensive road-building program were formulated prior to 1930, but large-scale construction dates from 1937. By 1941 the Peruvian section of the Pan-American Highway was open to traffic from the Ecuadoran border to the frontiers of Chile and Bolivia, a distance of some 1,860 miles.

A total mileage of 15,500 reported at the beginning of 1942 was greatly supplemented during the year by rapid progress on the so-called "penetration" highways which are to join the coastal region with the eastern hinterland across the Andes known as the "montaña".

Of most immediate interest is the new Central Highway which extends northeast from Lima across the Andes via Oroya, Cerro de Pasco, and Tingo Maria, to Pucallpa, a small port on the navigable waters of the Ucayali River. This 500-mile roadway which is scheduled for completion during 1943 will be the first trans-Andean highway to penetrate the Amazon basin of Peru. Its completion will be a great milestone in Peruvian history because it will open a vast, undeveloped region to settlement.

Of present significance is the fact that this road will make possible the trucking of rubber and other tropical products of wartime necessity to the Pacific coast—a shorter and faster route than the long journey down the Amazon.

The trip from Lima to the Amazonian river port of Iquitos, before the inauguration of airplane service, required either a month's journey on muleback and river launches over mountain trails and through Amazonian jungles or a long trip by steamer from Callao through the Panama Canal and up the Amazon River. By using the highway, travel time from Lima to Iquitos will be reduced to five days. A new oil field (Ganzo Azul) has been brought into production at a point on the Pachitea River about 25 miles from the highway near its eastern terminus. The proximity of the oil field to both the highway and navigable water is significant.

Mountainous terrain presents an extremely difficult obstacle to the highway engineer in Peru. Some roads leading from the coast to the Amazon region, such as the Central Highway, cross the Andes at altitudes of 14,000 to 16,000 feet, so that many of these passes exceed the elevation of Mount Whitney (14,500 feet), the highest mountain in the United States. It has been a Herculean task to build roads across this formidable cordillera extending the length of Peru, many of whose snow-faced peaks are more than 20,000 feet above sea level.

Despite such impediments, road building goes on at a rapid pace. New roads are linking former isolated areas more closely and may be expected to change greatly the country's economic structure.

What have you done for freedom today? We can't all fight, but we can all Buy War Bonds!

LANDING TOMORROW

THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

MARFAK

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

New Bridges from Old Is California Method

Steel Salvaged from Old Structures Aids in Reconstruction of Others, Lightens Burden on Mills

✦ FOR the past 18 or 20 months steel in all forms—structural, reinforcing, bolts, hardware, nails, etc.—has been severely restricted for civilian use. Where normally highway departments would use hundreds of tons each year in the construction and repair of all types of bridges, the work during the past several months necessarily has been restricted to projects of direct benefit to the war effort and those absolutely essential to the maintenance of highway service.

In the manufacture of steel, both iron ore and scrap steel are used. The scrap steel is essential to production of satisfactory new steel. The Government, therefore, has urged that all scrap which can be spared be turned in for that purpose. Accordingly, several months ago the State of California made a careful inventory of all scrap piles and released the scrap and salvaged steel not scheduled for reuse in the near future. In addition, steel trusses which had become obsolete as trusses and were used as trestles, with supplemental bents, were disposed of in order that the steel might go to the mills as scrap.

In a recent issue of *California Highways and Public Works*, W. A. Douglass, Senior Highway Engineer, California Division of Highways, reports several examples of scrap-steel salvage and its use in reinforcing other structures. One example of this was the steel-truss bridge across the old channel of the Santa Maria River in Santa Barbara County. There the portion of the trusses above the floor no longer served a useful purpose on the bridge and was removed to add to the nation's steel supply.

A large tonnage of scrap steel thus was contributed by the Division of Highways, but probably a more important contribution was effected by the *use* of salvaged steel where normally large quantities of new steel would have been required. In this regard there was not only a large saving in new steel, but the mill capacities were thus released for production vitally needed by the armed forces.

An old timber-truss across the Salmon River on the Klamath River Road had served its period of usefulness. It was replaced by a new truss fabricated of portions of a steel truss recently removed from the Robinson Ferry Bridge across the Eel River.

At the Boat Channel Bridge on the Harbor Drive project in San Diego, structural steel was salvaged from an abandoned bridge in that city, thus avoiding the use of many tons of new steel. A similar idea was followed in preparing plans for grade separations on the road from Santa Maria to Camp Cooke in Santa Barbara County. Arrangements were made to purchase a number of plate girders owned by the Western Pacific Railroad but unused for a number of years. From these girders the longer spans required in the new structures will be fabricated to the required length.

Other Examples

The urgently needed widening of an underpass at the western entrance to Sacramento will be made possible by the use of salvaged girders from an abandoned railroad bridge near Port Chicago.

On the state highway system are a number of steel-truss bridges designed and built, in most cases, by other agencies before present heavy truck traffic became general. While these trusses are

(*Concluded on page* 27)

A new ball-bearing sheave for the tail rope of scraper haulers.

Tail Rope Sheaves With Ball-Bearings

Tail rope sheaves for any type of scraping service must be sturdy and well-protected. Sullivan Machinery Co., Michigan City, Ind., has developed a special ball-bearing sheave for this service with side covers and sheave wheels of tough alloy steel. The hooks, eyebolts and clevises are forged from alloy steel and the extra-wide sheave wheel reduces rope wear. The openings are large enough to pass a square knot of rope and the quick-opening snatch block construction gives fast, easy rope change. Greasing is required but once a year.

These specially designed tail rope sheaves are illustrated and described in Bulletin 76-D which may be secured direct from the manufacturer by mentioning this item.

Manhole Fittings Of Precast Concrete

Due to the necessity of conserving critical materials, concrete is being successfuly applied to many new and novel uses, one example of which is as frames and covers for manholes. These concrete products, as developed by the Cast Stone Institute and United Concrete Form Products Co., are new in basic design and structural properties.

In form, this manhole cover is essentially a king post truss, giving maximum load-carrying capacity for the amount of steel and concrete which it contains. Attachment of the radial reinforcing rods to the enclosing channel rim is an important detail, contributing much to the strength of the cover by bringing the high compressive strength of the concrete into play under load. It also makes possible the relative thinness of the edge and the relative light total weight of the cover. This rim serves the additional purpose of preventing chipping of the corners of the cover from traffic wear and especially from the rough handling which the cover usually receives when manholes are opened.

The cover and frame are designed to carry the heaviest wheel loadings permitted on highways (16,000 pounds plus 25 per cent for impact). It is stated that tests have shown their actual load-carrying capacity is considerably in excess of requirements.

The standard design is applicable to sizes up to 27 inches in diameter, and in the case of manholes requiring openings larger than 27 inches in diameter, it is suggested that the continued use of cast iron for the cover with the substitution of concrete for the frame will in most cases save 70 per cent or more of the iron which would otherwise be required.

The concrete covers made by United Concrete Form Products Co. are unusually light in weight in relation to the service for which they are designed and in comparison with the conventional cast iron covers they replace. The cover for a standard 24-inch manhole weighs approximately 90 pounds as compared to 150 pounds usually required in cast iron covers for use under traffic. The precast concrete frame weighs approximately 200 pounds, while cast iron frames range from 225 to 390 pounds.

In cases where ventilation of manholes is necessary, holes can readily be provided by coring out between the ribs of the cover, without in any way affecting its load-carrying capacity.

State and county highway engineers with highways in urban areas under their jurisdiction may secure suggested drafts of specifications covering concrete manhole frames and covers by writing direct to the United Concrete Form Products Co., 101 Park Ave., New York City, or 5243 W. 25 Pl., Cicero, Ill., and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

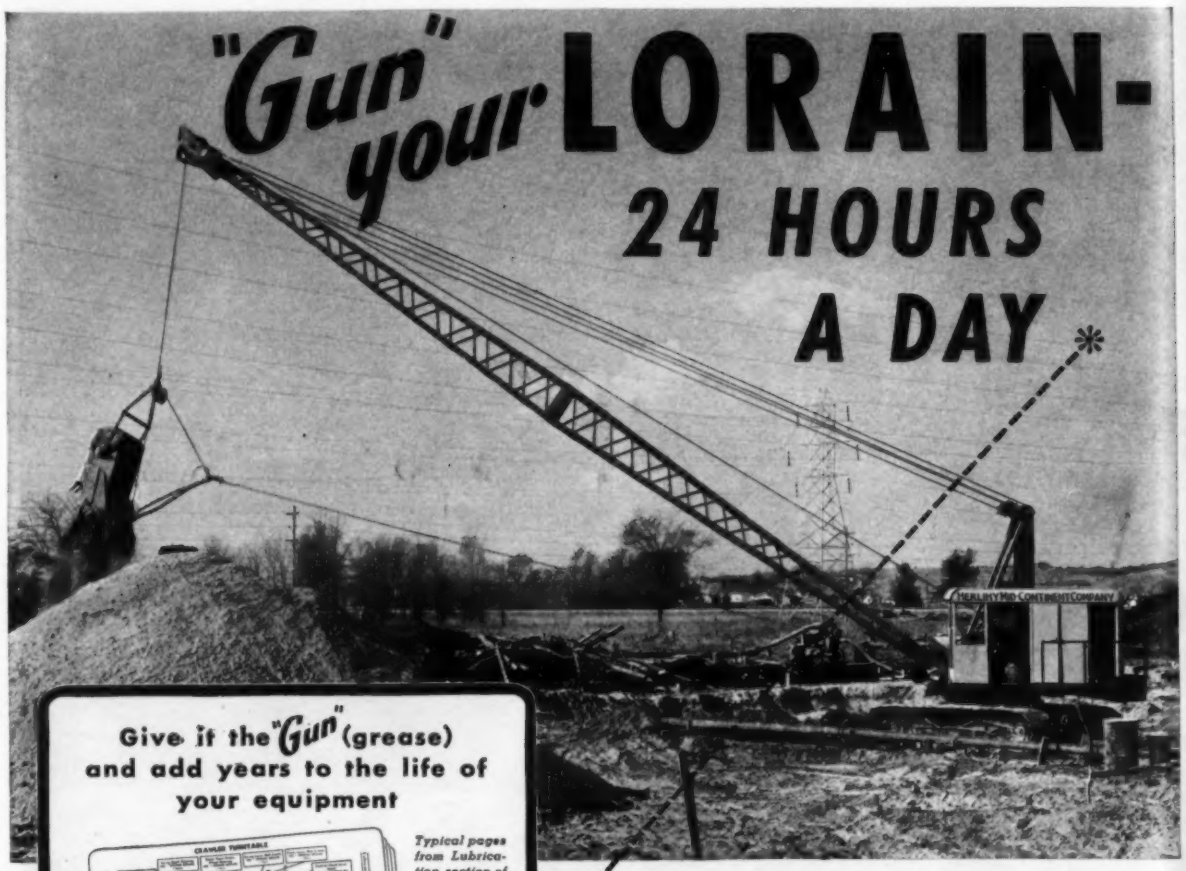
Engineering Handbook Issued by Bearing Co.

The new Hyatt Engineering Handbook is described as a "scrap-book" of fundamental engineering data such as any engineer might assemble himself to obviate the necessity of looking through various reference books to locate some needed information. In addition, the Handbook contains much entirely new material which eliminates time-consuming calculations in determining the loads occurring on roller bearings employed in automotive or industrial applications.

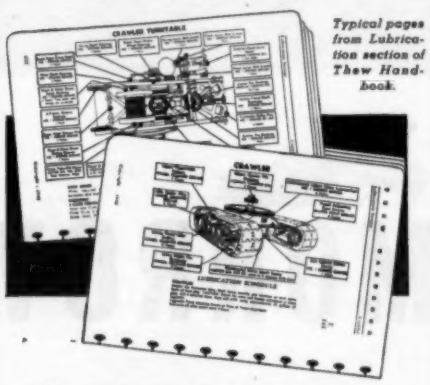
Mathematical symbols and abbreviations, measurement conversion tables, engineering formulae, plane areas, planes and solids, beam sections, circle constants, circumferences and areas of circles, determination of chords, trigonometric formulae, weights of steel bars, properties of round bars, standard pipe, and steel analysis are some of the subjects presented in tabular form. Other sections deal with the computation of bearing loads, gears, calculations for determining bearing loads, press fits, and the various types of Hyatt bearings.

Copies of this Engineering Handbook may be secured by engineers and contractors who can actively use it by writing direct to the Engineering Department, Hyatt Bearings Division, General Motors Corp., Harrison, N. J., on their company letterhead and stating their position in the organization.

Front End Shovels
For Industrial Tractors
Write for Descriptive Circular
White Mfg. Co.
ELKHART INDIANA



Give it the "Gun" (grease) and add years to the life of your equipment



Typical pages from Lubrication section of Thew Handbook.

All types of equipment need frequent and proper lubrication to prevent damage, delays and expense. One hour set aside in each day's schedule for this purpose will prolong the life and maintain the performance of your equipment. Lorain owners should write today for a copy of the Thew Handbook. It contains diagrams of lubrication points and recommended schedules for *all parts* of your Lorain as well as instructions on operation, adjustment and care. Give Lorain model and serial number when writing.

THEW-LORAIN
CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

* ***But*** **take care of it, too!**

It's "all work and no rest" for most Lorain machines these days—tough, round-the-clock jobs that *must* be finished so the next one can be started. Sure, it's a strain on the equipment but Lorains are built with the care and skill that lets them soak up extra work.

So we say, "gun" your Lorain but take care of it, too. A little extra care and service will prolong its life still further and ***help you do more with what you've got.***

LORAIN headquarters are in the field

There is a Lorain distributor near you who can help make your equipment last longer and work faster. Many distributors carry a representative stock of genuine Thew-Lorain ***factory-made parts.*** They have facilities for ***rebuilding*** machinery and know how to rebuild it properly; they can furnish ***on-the-job field service*** for repairs and replacement; they can serve as a ***clearing house*** for information on rentable equipment or booms you may need for converting present machines. Call on them often.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

Continuous Mixing For Asphalt Roads

Mountain-State Ordnance Depot Required 160 Miles Of Service Roads; Layout Of Plant Very Efficient

(*Photos on page* 68)

♦ TO surface 160 miles of 12 to 24-foot service roads in a mountain-state Ordnance Depot, the contractor installed a Barber-Greene continuous mixing plant as a stationary unit which delivered hot-mix at 112 tons per hour. The plant layout, asphalt piping and material handling throughout were unusually effective, aiding in maintaining plant production. Aggregate gradation was a problem requiring considerable study but the solution was found in a "back-yard" aggregate to supply the deficiencies in fines in the imported coarse aggregates.

A 100 Per Cent Gradation

The coarse aggregate available for the hot-mix was deficient in 10-mesh material and finer so it was necessary to find a cheap material that could be added to improve the gradation. This material was found right on the reservation less than a ¼-mile haul from the site selected for the plant. The "back-yard" aggregate was added to the coarse material at the rate of 40 per cent of the fines. A Lorain 40 shovel loaded the fines into a fleet of three trucks for the short haul. This material had a gradation of 200-mesh and other particles up to the 10-mesh so that when it was combined with the coarse aggregate it gave a practically perfect gradation. The resulting density of the mat as laid gave sufficient evidence of that fact as it showed a uniform weight of 146 pounds per cubic foot.

The coarse aggregate, which comprised most of the mix, was brought in by rail to the plant site and unloaded from the gondola cars by a Northwest crane and a 2-yard Owen clamshell bucket to a 2-compartment feeding hopper attached to the Barber-Greene plant.

Asphalt and Fuel Oil

The contractor was fortunate in having two spur tracks just north of the plant where he could spot aggregate on the near track and the asphalt and fuel-oil tank cars on the far track. A 30-hp horizontal steam boiler was used exclusively for heating the cars through the well-planned piping system that permitted heating four asphalt cars and one fuel-oil car from the four steam plugs. All lines were steam-jacketed, using a 2-inch steam header to the 3-inch asphalt line with its welded 4-inch insulated jacket. An Allis-Chalmers tractor was used for moving the asphalt and aggregate cars on the siding. It was equipped with a Bucyrus-Erie bulldozer so that its usefulness was extended to attention to the stockpiles when necessary.

Located immediately adjacent to the plant were the three asphalt storage tanks, two of 18,000 gallons and one of 12,000 gallons capacity. In the same shed were the two fuel-oil tanks, each with a capacity of 12,000 gallons. The fuel-oil pump and the boiler feed pump were located alongside the asphalt storage while the two Roper asphalt pumps for handling the asphalt from the tank cars to the plant as well as to storage were located at the rear nearer the tank-car siding. One of the pumps was used regularly while the other was maintained as a standby unit.

An oil-fired 100-hp steam boiler provided the bulk of the steam used at the plant for the steam-jacketed lines and for the operation of the reciprocating asphalt and fuel-oil pumps.

Continuous Mixing

From the feeding hopper the aggregates were delivered to the twin oil-fired driers of the plant and thence to the single hot elevator which raised the dry aggregates to a double-deck vibrating screen where the material was screened into ¾-inch maximum material, rejects and fines, and delivered to the 3-compartment hot bin. This was used as a two-aggregate bin with two compartments for coarse aggregate and one for fines. Each bin was equipped with an indicator showing the level of the material in the bin and also a pyrometer to show the temperatures.

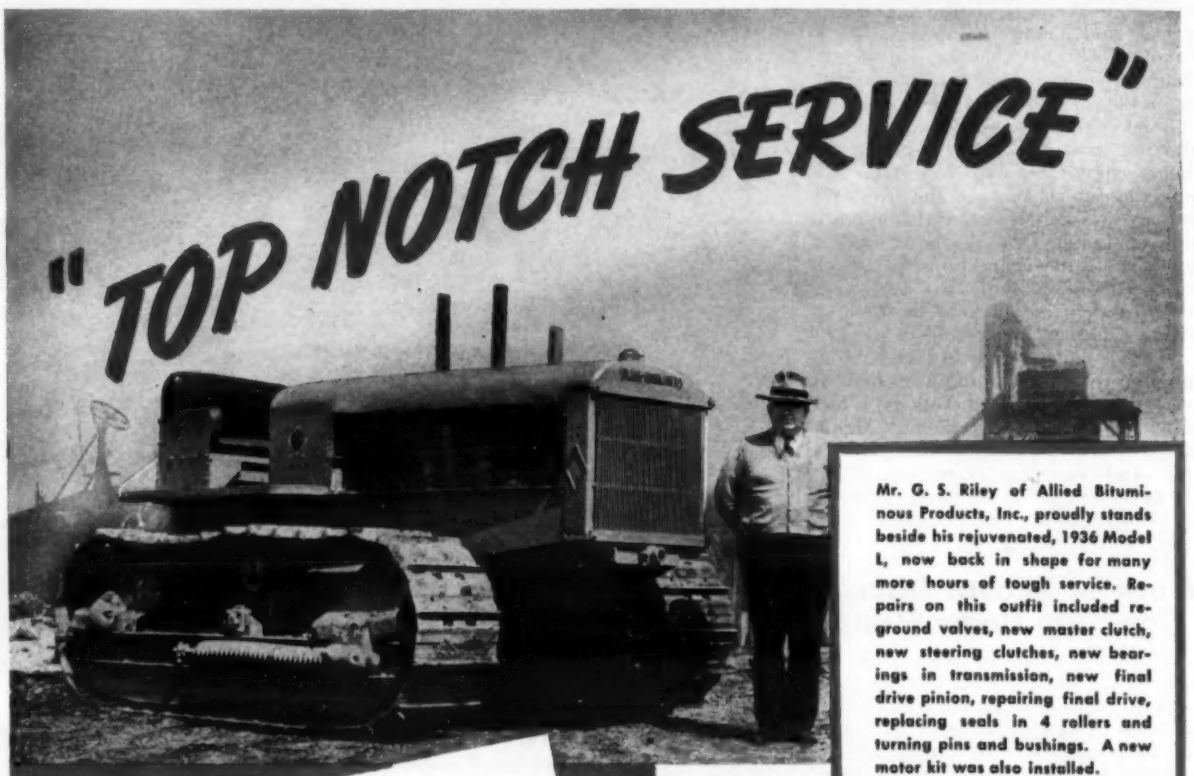
From the hot bin the materials were fed through calibrated gates to the metering conveyor, then raised to the belt feed of the continuous mixer where from 4.96 to 5.0 per cent of 140 to 170-pene-

(*Concluded on page* 64)

C. & E. M. Photo

Straight-line handling of materials featured the set-up of a large Barber-Greene continuous-mixing plant at a mountain-state Ordnance Depot to provide hot-mix for service roads.

"TOP NOTCH SERVICE"



Mr. G. S. Riley of Allied Bituminous Products, Inc., proudly stands beside his rejuvenated, 1936 Model L, now back in shape for many more hours of tough service. Repairs on this outfit included re-ground valves, new master clutch, new steering clutches, new bearings in transmission, new final drive pinion, repairing final drive, replacing seals in 4 rollers and turning pins and bushings. A new motor kit was also installed.

Allied Bituminous Products, Inc.
PRODUCERS - - - CONTRACTORS
Indianapolis, Ind.

April 22, 1943

Mr. E. W. MacAllister
MacAllister Tractor Company
808 Daly Street
Indianapolis, Indiana

Dear Mac:

This is just a little note of appreciation for the fine service you gave us on the Model L. As you know, that old 1936 outfit served us long and well and we figured it was about shot. When you told us what it would cost to rebuild it we were really surprised--and frankly we didn't believe you could do it for the figure nor as fast as you did.

We certainly are glad to have the "L" back on the job ahead of schedule and billed to us right at your estimated figure. That's what I call top-notch service. We have a considerable amount of work ahead and know that our Model L is now in shape to do its share.

Yours very truly,

ALLIED BITUMINOUS PRODUCTS Inc.

G S Riley — Vice President

HANDLING repair or rebuild work the way it should be handled . . . getting the job finished on time . . . and at lowest possible cost . . . that's Top Notch Service! It's the kind an Allis-Chalmers dealer recently gave to Allied Bituminous Products Company on a tractor overhaul job . . . the kind your A-C dealer is equipped to give to you.

His factory-trained mechanics are skilled in their work . . . have specially adapted tools for efficiently tearing down tractors and other road-building equipment and for reassembling them in a hurry. His shop is equipped with hoists for quickly lifting heavy sections. Machining facilities are readily available. Working quarters are of the best—ample and clean—assure careful handling of delicate Diesel parts. Replacements are genuine Allis-Chalmers parts. Welding worn or broken sections, cleaning and painting are all a part of his service.

His experienced judgment in sizing up a job enables you to know beforehand about what has to be done and what it will cost. Why not have your Allis-Chalmers dealer check YOUR equipment NOW . . . it will pay you many times over! Take care of your machinery and it will take care of you.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE, WIS., U.S.A.

COMMERCIAL HEAT TREATING
SEASONING OF STEEL

CADMIUM, ZINC, TIN and HARD CHROME PLATING

ALL KINDS OF GRINDING OPERATIONS

A Complete Manufacturing Plant

Metallurgical Laboratories

ENGINEERING DIVISION
AGERSTRAND CORPORATION
Muskegon, Michigan
Sales Office: 1900 E. Jefferson Ave. Detroit, Mich.

British Eighth Army Using U. S. Equipment

Air compressors that are "made in Milwaukee" are doing their part with the British Eighth Army in North Africa, according to a report from the British Information Service. Construction equipment that has gone to war will be back in civilian circulation again when "unconditional surrender" has been achieved.

A report published by *The Milwaukee Journal* mentions the mobile air compressors made by the LeRoi Co. of Milwaukee and quotes Private Edward T. Forsdike, who is in charge of these machines, "We have used it for rock drilling in the construction of new roads and in breaking rock for other purposes. We also use it to drive a circular saw for timber ripping, as well as a chain saw and other implements . . . The drums for the pressure hose are cleverly designed and, on top of that, the hose itself is good, while the connections are excellent. The whole thing has been very carefully thought out, and the tool kit with it could not be bettered".

There is much "Made in U.S.A." construction equipment in the front lines of every one of the United Nations, a fact of which we are justly proud. Manufacturers are now making sales plans to keep American-made equipment filling the peacetime needs of those countries not producing their own machines.

Work at Shasta Dam Goes Into Home Stretch

With the concrete in Block 58 in the right abutment of Shasta Dam in California at roadway level, the gigantic task of mass concrete placement has gone into the home stretch, according to Construction Engineer Ralph Lowry. Over 5,400,000 cubic yards of concrete have been placed in the structure, leaving less than 1,000,000 yards to go. As the majority of blocks in both abutment sections are nearing their ultimate height, the spillway section is to receive the bulk of the concrete yet to be placed.

On completion, Shasta Dam will contain 6,230,000 cubic yards of concrete, making it the second largest concrete dam ever built, and second in height to Boulder Dam, the world's highest.

For the past several weeks, concrete placement operations have been concentrated largely on the spillway section where five of the rows of blocks were brought to a height permitting installation of the lower tier of spillway outlets. These outlets are four steel-lined conduits each 8½ feet in diameter. Fourteen additional outlets of the same size will be installed at various levels as the spillway gap is filled. Two rows of blocks in the spillway section have been kept low and are used for river diversion. Concrete placement in the low rows will begin as soon as the valve installations in the diversion tunnel under the right abutment are complete. Work on two of the 75,000-kw generators in the Shasta power plant is also rushing toward completion. The ultimate installation will include five mammoth generating sets.

The construction of Shasta Dam is being expedited so that the structure may begin as early as possible to serve its designated functions of river regulation, improvement of navigation, flood control, supplying water for irrigation, salinity control, and power for war industries.

Rock-Drill Maintenance Record Sheets Available

The scarcity of critical metals makes it imperative to maintain rock drills, and all other equipment, properly and to avoid practices which cause abnormal wear on parts. Believing that a careful record of drill maintenance will assist in such conservation, the Ingersoll-Rand Co., 11 Broadway, New York City, has made available to all users of rock drills a supply of printed sheets to aid in recording repair and maintenance work and its cost.

These sheets, which are 8½ x 11 inches in size, designed to fit in any standard file and are punched for use in standard 3-ring binders, make it possible to show accurately the upkeep cost of every drill in service, as well as such pertinent data as the drill number, class, model, manufacturer, names and numbers of new parts installed, when they were installed, the cost of installing parts, number of shifts the drill works, etc.

A supply of these helpful record sheets may be secured free of charge direct from Ingersoll-Rand by interested contractors. Specify Form 2358.

Electrode Stub Control

In electric welding, the electrode is the only material which is expendable and therefore subject to waste. In view of the critical character of welding electrodes, because of the vast welding program for war production, it is important that stub waste be controlled as much as possible.

A simple plan for reducing electrode consumption by reducing stub waste is described in a folder which is available from the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. The originators of the plan received an Honorable Mention in the Foundation's Industrial Award Program.

High-Pressure Pumps

Light weight, high-capacity, self-priming

Unit 22HH, illus., delivers 65 gals. per minute against 50 lbs. pressure.

Unit 27 delivers 85 gals. against 70 lbs.

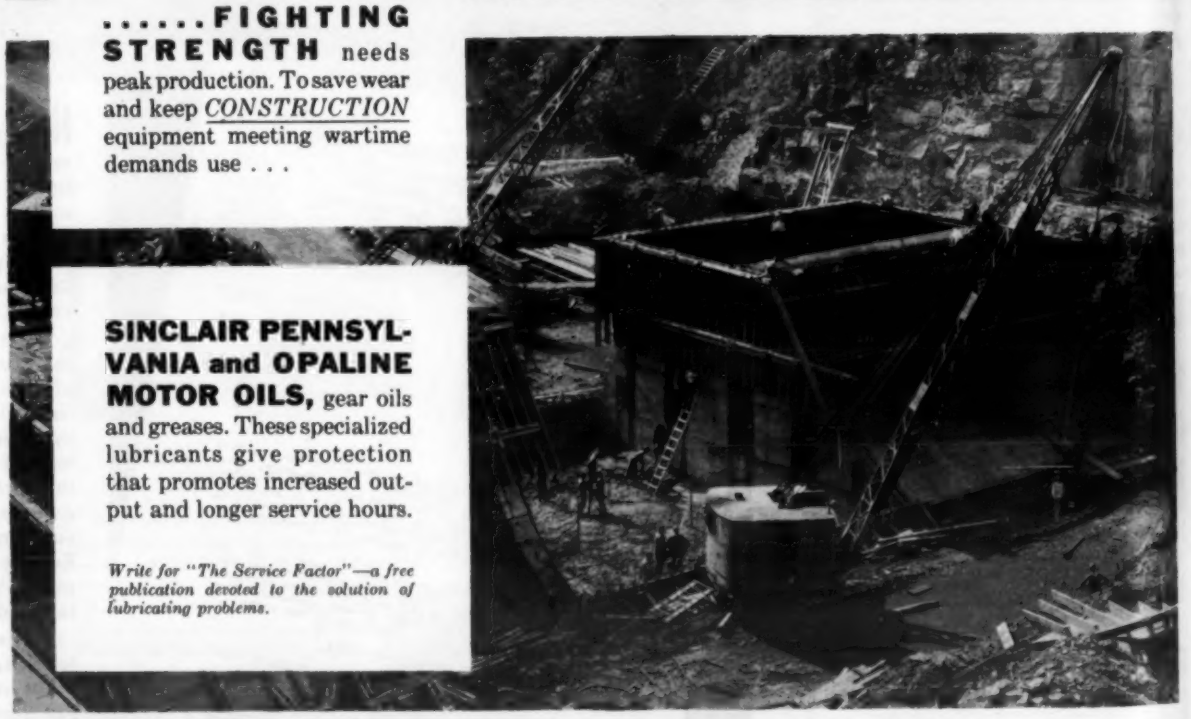
Unit 322 delivers 150 gals. against 100 lbs.

Suitable for fire fighting, jetting piles, supplying water to concrete mixers through long pipe lines against high pressure.

Ask for Bulletin 42-CEM

MARLOW PUMPS

Ridgewood New Jersey



.....FIGHTING STRENGTH needs peak production. To save wear and keep *CONSTRUCTION* equipment meeting wartime demands use . . .

SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS, gear oils and greases. These specialized lubricants give protection that promotes increased output and longer service hours.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago · 10 West 51st Street, New York City · Rialto Bldg., Kansas City · 573 West Peachtree Street, Atlanta · Fair Building, Ft. Worth

Rock, Earth and Clay Processed for New Dam

War Industries Protected By Dam Requiring 90,000 Yards Weekly to Raise it To Elev. 1,497 by Winter

(*Photos on pages* 1 *and* 68)

+ TO meet the request that Youghiogheny Dam, an earth-rock fill structure in Pennsylvania, reach Elevation 1,497 by December 1, 1942, the contractors for the 1,350-day project bent every effort to place 90,000 cubic yards of processed crushed shale, clay and earth per week in the 3,093,000-yard embankment. The primary purpose of the dam is flood control to protect vital war industries, with low-water regulation and pollution control of secondary importance. By reaching the required elevation before the job closed down for the winter, "Yock", as it is called, successfully withstood the spring floods.

The feature of the job was the special processing of the spillway excavation for use in the body of the dam. The rock in the spillway section varies from strata of indurated clay and shale to a hard sandstone with considerable overburden. The first two were processed and mixed with overburden and earth borrow for use in the dam, while the sandstone forms the variable-thickness rock blanket on both upstream and downstream faces.

The Dam

On completion the dam will have a maximum height of 184 feet, a length of 1,600 feet, and a crown of 25 feet. It will control the waters from 435 square miles of drainage area by impounding it behind the dam while the diversion tunnel carries away normal flow and flood waters. The spillway is designed to carry two and one-half times the maximum known flood.

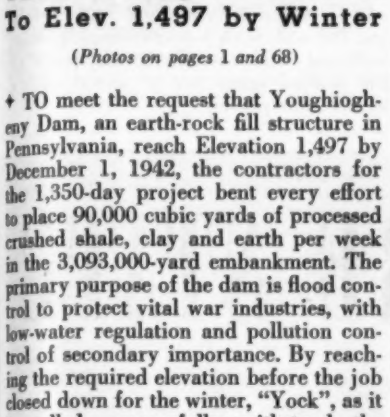
The entire area for the dam was stripped to a minimum depth of 6 inches and then a cut-off trench excavated to rock across the entire valley with a minimum bottom width of 25 feet. A grout cap trench was excavated in the rock, about 3 feet wide and 3 feet deep, and contains 3-inch black iron pipe set in the concrete through which 2-inch grouting holes were drilled to permit pressure-grouting of the foundation area adjacent to the cut-off trench. The core section was built of selected impervious material on slopes of 4 on 1 both upstream and down. From the core to the downstream toe of the dam is a 3-foot thick filter area of pervious material with a rock drain 7 feet thick, making the total thickness 10 feet. Outside the core is random fill on both sides, with a 2 on 1 outside slope and a rock blanket on the downstream face varying from a 1 on 3 through a 1 on 2½ to a 1 on 2 slope near the top. This rests on a transition layer of rocky soil between the earth dam and the rock blanket. This downstream blanket terminates in the rock toe and a 10-foot rock drain to carry away any seepage without damage to the earth structure. The upstream of the earth fill is 1 on 2½, on top of which is the 3-foot transition blanket, and then the rock blanket which varies from 1 on 4½ at the rock toe through 1 on 4, 1 on 3½, 1 on 3 to 1 on 2½ at the top.

Selected impervious fill used in the dam consists of overburden and material from borrow without the addition of crushed rock. Random fill is overburden with crushed rock and was spread so as to be 6 inches thick after rolling, with the rock well distributed throughout the layer. When examining the layers, it was

(*Continued on page* 36)

U. S. E. D. Photo

Wagon-drill operation at the spillway intake which furnished rock to be crushed for use in the dam.



★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. *Write for Bulletin CE-260.*

HETHERINGTON & BERNER INC.
Indianapolis, Indiana

Hetherington & Berner

SPRAY IT ON—AND CURING IS DONE
Early Water Retention with After-Protection
APPROVED BY UNITED STATES WAR DEPARTMENT ENGINEERS
TRUSCON
TRU-CURE
The Time and Money-Saving Method of Curing Concrete

NEW SPRAY MACHINE ASSURES UNIFORM APPLICATION

TRU-CURE application methods *now* assure absolutely uniform spreading of the curing compound over *each square ft.* of concrete even on windy days. It eliminates uncertainties heretofore associated with such applications. This method involves a special machine (patent pending) developed by **TRUSCON** engineers which operates from a bridge spanning the work.

TRUSCON TRU-CURE meets the emergency war requirements of speeding up concrete construction and helping out on man-power shortage. It assures stronger, harder and longer wearing concrete because of complete curing.

Applied by spray immediately after finishing, **TRUSCON TRU-CURE** forms a practically water-proof film. This film holds in the original mixing water in the concrete, thus insuring uninterrupted and complete curing of concrete. No need for paper, burlap, cotton mats or other bulky curing material. On actual laboratory tests **TRUSCON TRU-CURE** provides over 96% of water retention at 100° F. in the first twenty-four hours.

WRITE FOR LITERATURE to Department C-8 for information on the special Application Machine and this advanced method of curing concrete.

TRUSCON LABORATORIES DETROIT MICHIGAN

Gila Irrigation Project Is Expedited in Arizona

Construction of irrigation facilities on the Gila Project of the Bureau of Reclamation in Arizona will be expedited to provide dust control for the Yuma Army Air Base and increased food supplies in the Southwest, Secretary of the Interior Harold L. Ickes has announced. The Facility Review Committee of the War Production Board has removed the limitation which required 8,500 acres of the land to be irrigated primarily for guayule rubber planting. The action has been taken as a result of the contraction of the guayule rubber program.

Under a letter from Rear Admiral Ralph Whitman, Chairman of the Committee, the Bureau of Reclamation is permitted to extend the irrigation distribution system and carry on other essential work which will serve a dual purpose, because in putting the land under irrigation to curb dust from severe storms, alfalfa will be produced to aid in meeting requirements for forage for dairy and beef herds in the Southwest.

Work on the Gila Project was originally cleared by the WPB to have the land ready for guayule if required. With the announcement of a restricted guayule program, the tract to be irrigated by the Bureau was relocated to afford maximum dust control. About half the area is Government-owned land which will be put into production by the Bureau of Reclamation; the remainder is privately owned which will be provided with irrigation water through Bureau facilities.

Sodding in Minnesota

As part of Minnesota's roadside-development program, sodding is installed in ditch bottoms on all grading projects where the ditch gradient is 2 per cent or more and on slopes of 2 to 1 or sharper. The balance of all areas disturbed by grading operations is seeded to ground covers of alfalfa and brome grass mixture in farming communities and a Kentucky blue grass mixture for metropolitan areas, farmstead frontages, cemetery frontages and in the timbered areas.

Over 3,000,000 square yards of sod has been placed on Minnesota grading projects since 1936, at unit prices ranging from 11 to 25 cents per square yard which includes furnishing and installing the sod, with top dressing, seeding, watering, and also the maintenance of the sodded areas for a period of six weeks after placing.

Two of the Cedarapids Morak Plants producing base material for airports for the Contractors Service Corporation

New Athey Booklet Aids Maintenance and Repair

A new illustrated booklet on preventive maintenance and repair of Athey Forged-Trak wheels has just been published by the Athey Truss Wheel Co., 5631 West 65th St., Chicago, Ill. Combining recommendations for wartime care of Athey equipment with instructions on making new parts out of old, this booklet may be secured direct from the Athey company or from Athey-Caterpillar dealers.

The booklet clearly explains methods of rebuilding present used parts as a metal conservation measure. It shows how worn parts can be restored to their original usefulness through welding, illustrating with pictures the various steps of the process. Suggestions are also given on operation of equipment to assure the longest performance and lowest maintenance expense during these crucial days of new-machine shortages.

New Welding Handbook

As a helpful step in instructing users of the oxy-acetylene welding and cutting process how to prolong the life of their equipment, the International Acetylene Association has prepared a convenient 20-page pocket-size booklet entitled, "Handbook for the Welding and Cutting Operator". Written in an easy-to-understand style, it contains a list of concise do's and don'ts and other helpful information and suggestions on the care and maintenance of blowpipes, regulators, and welding and cutting accessories.

Copies of this handbook may be secured in reasonable quantities without charge direct from the International Acetylene Assn., 30 East 42nd St., New York City, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Griffin Wellpoint Opens Branch Office in South

Announcement has been made by the Griffin Wellpoint Corp., New York City, of the establishment of a branch office and warehouse at 633 No. Myrtle Ave., Jacksonville, Fla., with William J. Carr as Manager. A large supply of Griffin wellpoint systems, jetting pumps, and portable gasoline-engine-driven generators will be carried in stock for prompt shipment. The opening of this branch is designed to save contractors in the southern states time as well as long-distance freight and trucking costs.

BUILDING with

Cedarapids MOROK PLANTS Built by IOWA

for VITAL DEFENSE JOBS

all produced by

CONTRACTORS SERVICE CORPORATION

Camp Hill, Pa.

THREE million, two hundred ninety two thousand, two hundred and seventy six tons of aggregate! Think that over! That's the output of the Cedarapids Morok plants of the Contractors Service Corporation of Camp Hill, Pa. Here's enough aggregate to bury the 1250 ft. height of the Empire State Building. All of this tremendous output went into seventeen vital defense projects including such jobs as Chambersburg, Pa., which alone involved over a million tons. The output was accomplished in two seasons despite the sixteen moves that the many projects involved—over a million tons the first season—over two million tons the second season!

It is figures like this that we want you to remember about Cedarapids. Such tonnage as this isn't secured with transportation delays, erection difficulties or "down time" on the job. In output figures of this kind, lies your assurance of the proved design of Cedarapids equipment.

There is a full range of Cedarapids plants for every output or material problem. No matter what you are considering if it has to do with aggregate reduction and preparation, call Iowa first. Come to Headquarters for Aggregate producing equipment.

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa

Hints on the Care Of Pneumatic Tools

Precision-Made Tools for Rugged Service May Easily Be Damaged; Attention to Care and Lubrication Pays

✦ THE "Green Hand" is not the name of a sinister movie thriller, but the damage he can do to tools sends very real shudders up and down the spines of contractors and highway equipment superintendents. It is for the benefit of your "green hands" and for older employees who may have become careless in the handling of pneumatic tools that we have prepared this discussion with the help and advice of some of the best compressed-air men in the country.

Lubrication

The modern rock drill is a precision tool, built to withstand high-speed operation and constant pounding but, while it is built for rough handling and "can take it", the observance of simple precautions in care and operation will result in greater drilling speed, less upkeep cost, and longer life. The proper and adequate lubrication of a rock drill with an oil of high film strength is of the utmost importance. Equally important is the selection of an oil of the correct SAE rating for the prevailing operating temperature.

In general, for dry drills, paving breakers, pneumatic diggers, and tampers, a good reliable rock-drill oil of SAE-20 viscosity may be used in winter and a SAE-30 oil in summer. For greater refinement in the use of oil, the following viscosity numbers are suggested for the operating temperatures shown:

Operating Temperature Range	Recommended SAE Viscosity Number
Below 20 degrees F.	SAE-10 or lighter
20 to 40 degrees F.	SAE-20
40 to 80 degrees F.	SAE-30
80 to 110 degrees F.	SAE-40
Above 110 degrees F.	SAE-50

All of the major oil companies have devoted much time, technical talent, and effort to developing suitable oils for rock-drill and air-tool use. For wet drills they make special rock-drill oils which resist washing away by water and air. Oil for all types of drills should be secured only from reputable oil companies.

Most hand-held sinker-type rock drills are provided with one or more oil chambers, closed with filler plugs. These oil pockets should be filled before starting the drill and about every three hours afterward. This is especially important when the drill is new.

Failure to lubricate properly, or the use of a poor grade or the wrong viscosity oil, may cause severe damage to a rock drill. Practical rock-drill men tell us that in nine cases out of ten when a rock-drill piston sticks, the cause is lack of oil. Any machine with parts as close fitting as a rock drill, if operated without lubrication, will finally stop running from a "scuff" or scoring caused by over-heating or from a broken piston or other part. The over-heating results in minute cracks across the surface at right angles to the direction of motion. These cracks are often visible to the naked eye, even without being etched with acid. Many operators feel that the cracks are so small that they will not cause any damage. But it is recognized among metallurgists that even the smallest crack on the surface of a hardened part may, and often does, cause a progressive fracture which the uninitiated may refer to as a "flaw in the steel" when the piece finally breaks.

Aside from the fact that proper lubrication prevents damage to the working parts of a rock drill, are there other benefits? Experts in rock-drill work have themselves been surprised to find how much proper oiling will speed up drilling. One man reports that he spent the best part of an afternoon in a quarry running various drills, first when they were just moderately dry as to oil, and then with a generous dash of oil before starting each hole. He found repeatedly that the machine would cut half again as much when properly lubricated. Drill men will agree that, in consideration of the additional drilling done, it is well worth the small amount of time required to keep the machine properly lubricated.

Line Oilers

Users of drifters and stoping drills are familiar with line oilers which you put into the air line and which take care of the oiling of the machine, provided it is filled up twice in a shift. When this oiler is used for lubricating drills on tunnel jobs, it is generally connected to the machine through a 10-foot length of hose. It is desirable to put the oil as close to the drill as possible, but when attached to a hand-held drill it is not convenient to have it very close for the reason that the hose cannot be so easily dragged around when the oiler is in the line.

Oilers are frequently attached at the manifold when used with hand drills or paving breakers. The only difficulty with this arrangement is that the oil has to work its way through some 50 feet of hose and, especially with new hose, a day or two will elapse before sufficient

(*Continued on page* 24)

INSURE
PROPER CONCRETE
CURING

with

WILLIAMS
SUB-GRADE
PAPER

Write us for
information on other
Papers meeting
Federal Specifications
particularly UUP-536

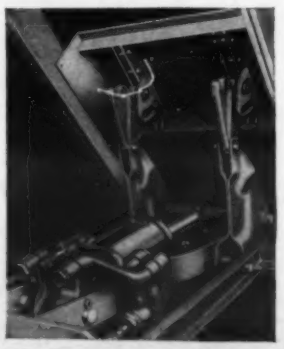
WILLIAMS
ROOFING PRODUCTS CO.
North Kansas City, Mo.

A HERCULES HYDRAULIC BOOSTER HOIST

MAKES ANY TRUCK A... DUMP TRUCK

Install HERCULES DOUBLE-ARM HYDRAULIC HOISTS under your platform, stake, express or special bodies, which are now idle. Unload the easy way!

With wartime restrictions preventing your purchase of all the new equipment you need, it's more important than ever that present equipment be used at maximum efficiency.



Model KXE Hercules Booster Hoist, with 6" cylinder, for bodies up to 12 feet long. Rated capacity of 4 tons with a 9 foot body. Control valve is operated from the driver's seat, and the low oil pressure required assures long life of unit.

Reinforcing plate relieves lifting strains. Assembly includes 12 foot steel sills for reinforcement of wood body sills.

HERCULES STEEL PRODUCTS COMPANY
GALION, OHIO

New Traffic-Line Paint For Roads and Airports

Porcelite traffic zoning paint which is claimed to provide unusual permanence and visibility for markings on highways, streets and airport runways, is described in a new bulletin issued by the Thomson-Porcelite Paint Co., 829-35 N. Third St., Philadelphia, Penna. This new material, formulated on synthetic principles, is applicable to concrete, asphalt, stone, wood, wood-blocks or composition materials, doing the marking job in one coat. On creosote blocks, a special primer is furnished to prevent bleeding. It is stated that Porcelite may be applied by traffic striping machine or hand brush, leaving a clean scuff-proof line or letter, and that it dries for traffic in 20 to 30 minutes.

Copies of this bulletin on Porcelite, which is available in white and yellow, or in special shades to order, shipped in 55-gallon drums, may be secured by interested state and county highway engineers direct from the producer by referring to this item.

More Scrap Needed

The long winter has affected collections of scrap, according to the War Production Board, and has resulted in a reduction in inventories. These inventories must be maintained and should be increased in order to insure maximum steel production. Because of the uncertainty of the future flow of scrap, it is vitally necessary to maintain collections and to intensify them in an effort to add to the nation's stockpiles.

Both the farm and construction industries have already furnished large volumes of scrap for the war effort, but the WPB is appealing for still more, pointing out that the total needs for scrap this year will be nearly as high as in 1942 to take care of the expanded steel-making program, in spite of the increased pig-iron production.

Take another look around your yards and shops. Don't scrap anything which you can use to maintain your present equipment in working condition; but *do* scrap anything you cannot use, and do so at once.

New District Engineer For Asphalt Institute

Announcement has been made by The Asphalt Institute of the appointment of Hugh A. Wallace as District Engineer for the territory comprising Texas, Oklahoma and Arkansas, with headquarters in the newly established Institute office in the Southwestern Bldg., Dallas, Texas.

YOU CAN'T MISS...

You can't miss enjoying better performance ... lower upkeep cost ... improved lubrication ... complete parts information ... with the new BLAW-KNOX CONSTRUCTION EQUIPMENT MANUALS.

These instruction manuals are real hand books which illustrate and explain every part of the machine, even the engine drive down to the smallest cotter pin and lock washer.

The manuals tell how to operate the equipment efficiently ... how to lubricate correctly ... how to make adjustments and repairs ... how to diagnose troubles—how to overcome them. They include complete parts lists.

All the manuals are fully illustrated with detailed pictures and drawings ... all information is completely cross-indexed and easy to find.

With these new manuals, users of Blaw-Knox Construction Equipment can reduce "time-outs" for replacement and repairs, improve and simplify maintenance, establish a more correct lubricating procedure, and enjoy more continuous and satisfactory operation on the job.

Owners of the latest models of Blaw-Knox Construction Equipment can obtain copies of the manuals shown above by writing for them on their business letterhead, stating the *model* and *serial number* of each machine.

6" x 9" PAGE SIZE

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2057 Farmers Bank Building, Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities

★ ★ FOR VICTORY BUY U. S. WAR BONDS AND STAMPS ★ ★

Truck-Mixed Concrete For Walls of Roadway

(*Continued from page 2*)

running down the face. This is a minor detail, but the experience of the Ohio Department of Highways has shown that it maintains the face of the wall in better condition by preventing the formation of dirt streaks from rain water. Another feature which adds to the attractiveness of the face of the wall by breaking up the flat area is the use of three vertical lines of rustication in the wall below each hand-rail post and single lines between on 4-foot centers.

The forms for the retaining walls were made up of standard panels of 4 x 16-foot ¾-inch plywod with 2 x 6-inch studs spaced 16 inches on centers and 2 x 6-inch wales spaced approximately 31 inches on centers. For end wales four 2 x 12-inch shanks were used with 1-inch tie bars running the full length of the 20-foot 6-inch, or 19-foot 6-inch, wall sections. The walls were poured in alternate sections, alternating the 20-foot 6-inch and 19-foot 6-inch sections. After the forms had once been assembled for a complete section, they were moved in four parts, the two ends, the front and the back. A Lorain crane with a 60-foot boom and a Lima 601 crane, also with a 60-foot boom, were both used for handling the form panels and for placing the concrete in the forms.

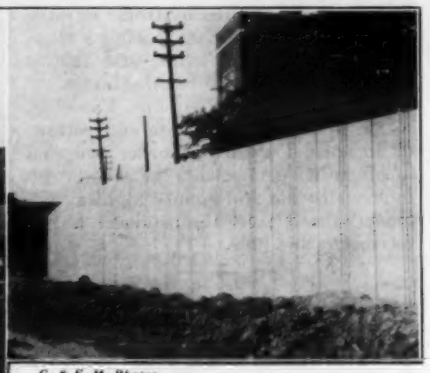
For tying the forms from front to back, ½-inch intermediate-grade steel rods were used with Superior form clamps. These rods were threaded on the job by a Beaver Model C threader.

Pieces of sheet metal with holes in them were cast into the footing for the walls and were used for wiring the back form to the inside to prevent its overturning because of the 4¼-inch per foot batter.

Pouring the Walls

Truck-mixed concrete was used entirely for the walls on this job. The concrete was delivered in 2 and 2½-yard Jaeger Truck-Transit mixers and Blaw-Knox Truk-Mixers. These trucks backed onto wood ramps to raise the delivery gate to a sufficient height to permit pouring direct from the truck mixer into the 1-yard Blaw-Knox Roller-Gate and Heltzel bottom-dump concrete buckets. The concreting crew at each pour consisted of a bucket spotter on the ground, one man at the top of the forms dumping the bucket into the wood hopper over the elephant-trunk chute, and four men treading inside the forms and using a concrete vibrator. The front form was stripped the morning after pouring, followed by the back and end forms, and the entire surface covered with burlap which was kept wet until the beam test showed sufficient strength.

The joints between wall sections were made water-tight by means of a six-sided opening, three sides of which were in the concrete and three sides formed by sheet metal held against the face of the concrete by nails cast in the concrete and clinched to hold the sheet metal. Over this two layers of cloth and asphalt paint were applied to seal the sheet metal. Dry



C. & E. M. Photos

Concreting a section of retaining wall, at left, and, above, the completed job on the new depressed industrial access road in Lockland.

Volclay was packed into the opening as the sheet metal was applied. This material has the ability to expand about 200 per cent when it absorbs moisture, thus stopping leaks at the joints. A Littleford Bros. tar kettle was used to heat the asphalt for the membrane waterproofing.

Quantities

The major quantities for excavation, embankment, retaining walls and the dual concrete pavement were as follows:

Excavation and Embankment		
Excavation, unclassified	213,250	cu. yds.
Embankment	164,771	cu. yds.
Embankment plus 20 per cent allowance for shrinkage	197,725	cu. yds.
Concrete Retaining Walls		
Excavation, structural	15,895	cu. yds.
Concrete for walls	13,648.4	cu. yds.
Concrete for footings	4,941.2	cu. yds.
Expansion joints	2,180.2	ft.
Contraction joints	2,119.3	ft.
Reinforcing steel	32,641	lbs.
Premoulded bituminous expansion joints, 1-inch	9,819.5	sq. ft.
Porous backfill	4,348.4	cu. yds.
Reinforced-concrete pipe, 8-inch	4,781.44	ft.
Excavation, channel	30,611	cu. yds.
Concrete Pavement		
9-inch pavement	40,132.2	sq. yds.
9-inch red pavement	5,241.1	sq. yds.
7-inch pavement for drives and approaches	3,826.4	sq. yds.
9-7-7-inch temporary pavement	1,997.9	sq. yds.
6-inch pavement for drives	332.1	sq. yds.
6-inch black concrete for mall	381.6	sq. yds.
9-6-6-inch pavement	149.7	sq. yds.
11-inch pavement	33.2	sq. yds.
13-14-13-inch black concrete	1,226.1	sq. yds.
Asphaltic-concrete surface	20.0	sq. yds.
18-18.5-inch black concrete	1,089.5	sq. yds.
Concrete curb and gutter	11,380.7	ft.

For drainage 6, 12, 15, 18, 30, and 36-inch concrete pipe was used.

Miscellaneous Items

The Cooper Avenue approach to the

(*Concluded on next page*)

TRANSITS and LEVELS

HEADQUARTERS for REPAIRS—any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog EC-86 of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

WARREN-KNIGHT CO.

Mfrs. of Sterling Transits & Levels

136 N. 12th St. · Philadelphia, Pa.

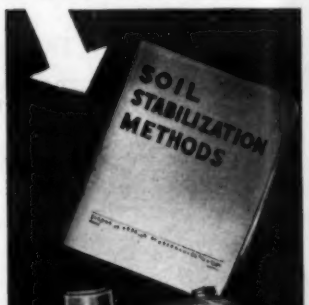
"They've Grown-up Together—"

SOIL STABILIZATION and THE SEAMAN PULVI MIXER

In the very early days of modern soil-stabilization SEAMAN engineers were present at almost every job of consequence,—as they are today. Development of soil-stabilization processes has marched hand in hand with the development of the SEAMAN MIXER,—each has contributed immeasurably to the progress of the other. Important to the engineer and the contractor however—is the fact that the SEAMAN MIXER is specifically and efficiently engineered to every requirement encountered in in-place mixing or pulverization operations in soil-cement, bitumen, resin, calcium chloride or stabilization without applied binder.

"They grew up together!" That's why SEAMAN knowledge of soil stabilization processes has resulted in a machine that has established unequaled production records at such low costs that the equipment has often repaid its investment in one week of operation.

SEAMAN engineers have compiled a handbook of detailed and practical information entitled "SOIL STABILIZATION METHODS." A copy is yours for the asking.



Model MHD 72

For jobs less extensive SEAMAN offers the THD series of MIXERS—operated by tractor power take-off. Just as rugged,—just as carefully engineered as are the Motorized (MHD) models.

PIONEERED by Seaman

The SEAMAN PULVI MIXER

SEAMAN MOTORS

305 N. 25th STREET · MILWAUKEE, WIS.

Old Canal Converted To Ohio Access Road

(*Continued from preceding page*)

depressed roadway is on a 47½-degree curve with a variable-height retaining wall.

For the red concrete in the acceleration and deceleration lanes, four pounds of red-iron oxide were used per sack of cement. When the quality of this oxide deteriorated because of war demands, it was necessary to double the amount of oxide used in the top 2 inches of the pavement to secure a distinctive red color. Similarly, the four pounds of black oxide used for the mall, as well as for the curb at drainage structures, required that the usual 4 pounds of black oxide be doubled to secure a distinctive black.

The original design for the catch basins had a cast-steel lip at the inlet but, with the restrictions on the use of steel, the inlet slot was redesigned slightly to permit a thicker slab at the top and a precast concrete cover was made for use instead of the standard cast-steel cover.

Personnel

The contract for this 2.214-mile industrial access road was awarded to the Byrnes-Conway Co. of St. Bernard, Ohio, by the Ohio Department of Highways. For the contractor, P. E. Hickey was General Superintendent, with Robert E. Hickey as Assistant Superintendent. For the Ohio Department of Highways, Hal G. Sours, Director, and T. W. Kinnear, Chief Engineer of Construction, Roger Towle was Project Engineer.

Practical Pointers On Care of Engines

A very thorough and understandable manual on the maintenance of gasoline engines has been released by Ethyl Corp., Chrysler Building, New York City, in its campaign to aid in the conservation of vehicles and parts essential to motor transportation. While the campaign as a whole is planned to increase the value of the Service Station "around the corner" to the owner of one or two trucks, certain manuals prepared for this campaign are of inestimable value to contractors and state and county highway departments maintaining their own service garages for the care of fleets of trucks.

"Practical Pointers on Engine Maintenance" is the type of manual every shop mechanic and equipment superintendent welcomes because it is written in simple concise language, has plenty of diagrams, tells what troubles may be expected in the different parts of an engine and how to correct them.

A "Preventive Maintenance Control Kit" has been prepared for the Service Station operator setting up a check system for individual trucks, and "Prescriptions for Preventive Maintenance Control", another helpful booklet, is a complete guide to the inspections, adjustments and servicing called for by the red, white and blue cards in the Control Kit. Equipment men who are giving serious consideration to overhauling their check-up system on trucks will find these two booklets helpful in keeping the system simple, workable, and productive of greater mileage between general overhauls.

Copies of "Practical Pointers" are available to readers of CONTRACTORS AND ENGINEERS MONTHLY if they will write on their business or official letterhead, stating the number of trucks operated. The other two booklets will be included if readers are particularly interested in improving their check-up systems. Mention this item, state whether you desire only "Practical Pointers" or all three booklets, and address your request to Russell B. Weston, Ethyl Corp., Chrysler Building, New York City.

"Facts and Figures" In Handy Pocket Size

The sixth edition of "Facts and Figures", in a convenient vest-pocket size for ready reference, has recently been published by the Pioneer Engineering Works, 1515 Central Ave., Minneapolis, Minn., manufacturer of quarry and gravel producing equipment.

In addition to tables of weights and measures, safe loads, standard pipe threads, state highway mileages, volumes of sand or gravel in stockpiles, definitions of geological terms and similar oft-needed facts and figures, the booklet also contains data on Pioneer crushing and screening equipment, tables of quantities of aggregate and cement for batches of concrete, a chart showing the percentage of each size of stone in the product of a crusher, belt-conveyor information, loading capacities of draglines and power shovels, and other information useful to contractors and engineers.

Copies of "Facts and Figures" may be secured without obligation direct from Pioneer by mentioning this item.

ASPHALT PLANK FLOORING

Manufactured by **SERVICISED**

Servicised Mineral Surfaced Asphalt Plank is widely used for Bridges, Approaches, and Railway Crossings. Our Standard Asphalt Plank is a water-proof protection for concrete structure used in underpass construction to prevent seepage of water against damage to the inner concrete walls.

This plank flooring is also installed in various manufacturing plants; as well as loading docks.

Pioneers in the Manufacture of Approved Construction Materials for over twenty-three years.

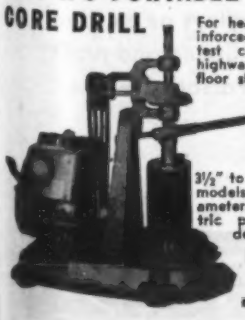
Send for Free Catalog on Plank Flooring

SERVICISED PRODUCTS CORPORATION

6051 W. 65th Street Chicago, Illinois

NEW H-S PORTABLE ABRASIVE CORE DRILL

For heavy drilling of reinforced concrete—taking test cores in concrete highway construction and floor slabs. Drills holes



3½" to 6½" dia. Smaller models down to ½" diameter. Gasoline or electric power. Write for descriptive circular.

HOWE-SIMPSON, Inc.

30 E. Broad St. COLUMBUS, OHIO

If it's Rock you're Hauling

KOEHRING DUMPTORS ARE YOUR BEST BET

Here is good pictorial proof that Koehring Dumptors can haul and dump rock of any reasonable size and come speeding back for more. Wide body opening means easy loading, and gravity dumping is instantaneous. The massive chassis easily withstands the shock of constant heavy duty service. Koehring Dumptors will save you valuable time too, with three speeds in either direction, quick load spotting and dumping up to the edge of the fill. Haul rock faster with a Koehring Dumptor.

Your Koehring Dumptor will last much longer with proper lubrication and care . . . depend on your Koehring equipment distributor and use genuine Koehring parts.

KOEHRING COMPANY • *Milwaukee, Wis.*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

The new Cornell rolling wood grille for use in highway shops and garages.

Wood Rolling Grille For Highway Shops

The new Cornell rolling grille or barrier, designed to use the minimum amount of critical materials, which was recently announced by the Cornell Iron Works, Inc., 36th Ave. and 13th St., Long Island City, N. Y., is suitable for use in contractors' and highway department shops and garages for providing barriers or partitions which can be rolled up out of the way when desired.

This new wooden grille uses wood bars strung on light steel tapes operating up and down in wood guides. The grille coils overhead on a horizontal counterbalanced shaft, giving the same operation as the Cornell rolling steel grille. No wall or floor space is taken up, as the coil is entirely out of the way. Operation is either push-up or, for the larger sizes, by hand chain or electric motor. The grille locks into the side guide with a padlock and hasp on the bottom bar, and offers the advantage of being replaceable by a steel grille at a later date, if desired. The grille is available for opening widths up to 19 feet and for unlimited heights.

Further details on this new wood grille, which follows the design of Cornell wood rolling doors in order to conserve war materials, may be secured by those interested direct from the manufacturer. Just mention this item.

New Kotal Distributor Is Appointed in Alaska

The Lomen Commercial Co., of Seattle, Wash., and Nome, Alaska, pioneer in Alaska since the gold-rush days, has been appointed by the Kotal Co., New York City, as distributor for Kotal, the chemical compound for speeding up asphalt road and airport construction, even under adverse weather conditions.

Headed by Carl J., Ralph and Alfred Lomen, the Lomen Commercial Co. has played a large part in building Alaska. Beginning with the great stampede to the Nome Gold Fields in 1900, its officers have devoted their time and abilities to mining, merchandising, transportation, highway and airfield construction and machinery. The general offices of the company are now located in Seattle, Wash., and operating offices and warehouses are maintained at Nome, Fairbanks, and Anchorage, Alaska, with a representative in Juneau.

Among the manufacturers whose equipment is handled by Lomen are Allis-Chalmers Mfg. Co., Chicago Pneumatic Tool Co., Delco Appliance Corp., General Motors Diesel Division, Timken Roller Bearing Co., and Standard Oil Co. of California.

The Lomens are looking forward to a great future in Alaska, believing that in an air-conscious post-war world, Nome may well become a crossroads to the Orient, equivalent to the position occupied by Suez in the waterborne transportation of an earlier generation. At the present time, the company is concentrating on moving equipment and supplies for the vital development program of highway and airport construction now under way in Alaska and the Aleutian Islands territory.

MARVEL
"VICTORY MODEL"
ASPHALT KETTLES AND SPRAYERS
Marvel Equipment Manufacturers, Inc.
224 So. Michigan Ave., Chicago, Ill.

The better the efficiency of your materials handling methods and machinery, the quicker and better you can finish a job. Investigate the possibility of improving your present materials handling methods. Consider the advisability of entrusting your problems to ROBINS. Send for bulletins in which you are interested.

FOR MATERIAL AID in MATERIALS HANDLING
It's ROBINS

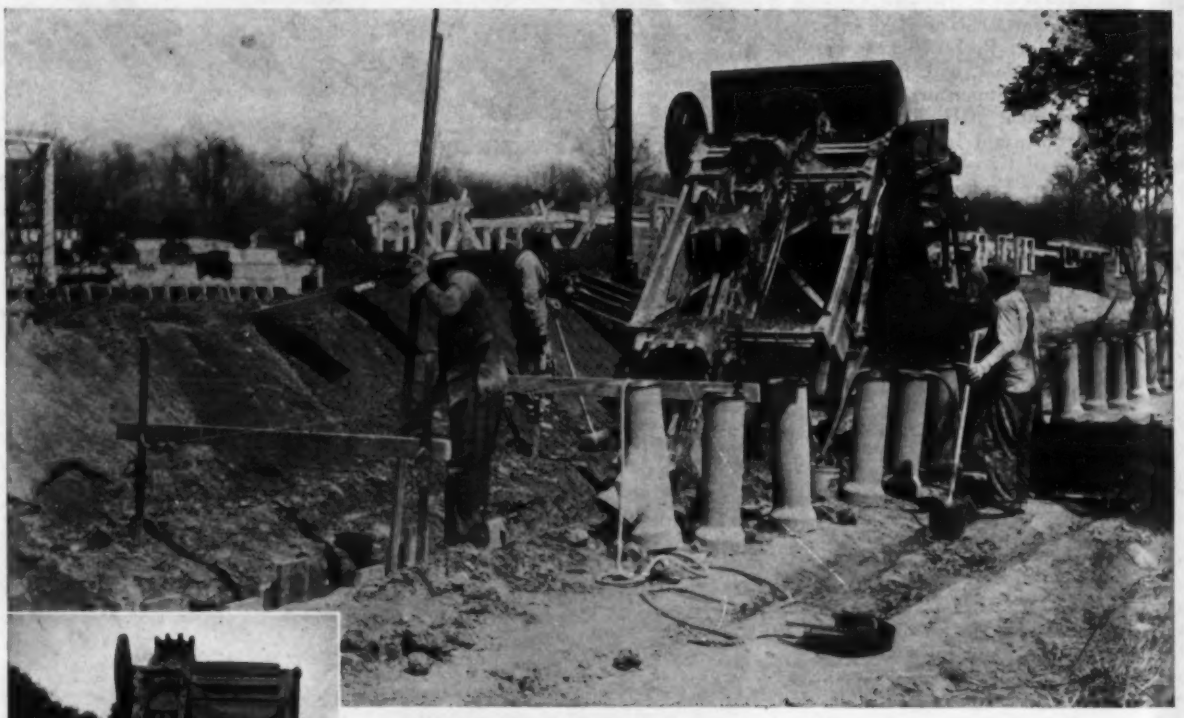
110CM • CONTRACTOR'S SCREEN. Small, semi-portable, general-purpose.
111CM • ELIPTEX SCREEN. For coarse sizing.
115CM • GYREX SCREEN. For heavy-duty sizing and scalping.
122CM • VIBREX SCREEN. For fine sizing.
113CM • SCREEN CLOTH. Improved Super-Gyraloy is longest wearing.
120CM • IDLERS. Troughing, Training, Rubberdisc, Return.

ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS
INCORPORATED
(ROBINS CONVEYING BELT CO.)
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

PARSONS



Parsons Trencher cutting ditch between pavement edge and steep bank. Only an offset boom could work in these restricted quarters successfully.

TRENCHERS Set Pace for Housing Projects

Parsons' speed and dependability made them first in the field when cantonments, airports and ordnance plants were constructed. And now Parsons Trenchers continue to set the pace in housing jobs throughout the country. Sewer, water, gas and electrical distribution systems must be completed first before homes can be built. Only because these machines are compactly built with alloy steels, anti-friction bearings and enclosed hardened gearing can uninterrupted, profitable operation continue. The original Parsons' patent — Offset Boom — permits excavations in narrow alleys or on road shoulders, making trenching possibilities unlimited. Speed and profit are easily available on housing projects with a Parsons Trencher.

SEE YOUR NEAREST DEALER TODAY.

THE PARSONS COMPANY • NEWTON, IOWA

TRENCHING EQUIPMENT

Gravel Production For Alcan Highway

Contractors Dug In for Winter and Stockpiled Gravel and Stone for Surfacing in Spring

(*Photo on page 68*)

AS the first snows of the long dark winter swirled in from the Arctic along 1,480 wilderness miles, dozens of American and Canadian contracting firms in isolated winter camps holed in and prepared to continue through the winter the gigantic task of producing 34,000,000 cubic yards of gravel and crushed rock for the new grade of the Alcan Highway. This greatest of graveling requirements in road-building history presented problems of similar magnitude to the construction of the grade itself.

The graders and the gravelers have worked together since last mid-June, when subcontracting firms under the PRA-negotiated management contracts of the Okes Construction Co., St. Paul; Lytle & Green, Sioux City; Dowell Construction Co., Seattle; and R. Melville Smith Co., Ltd., Toronto, turned the first dirt. In less than four months, the private contractors working in close cooperation with the U. S. Army's hell-bent-for-Fairbanks engineers blasted the roots from every highway-construction record in the world.

There was ice and snow and mud and muskeg. There was tangled brush and forests of spruce and pine, rough foothills and the stern peaks of the Canadian Rockies, precipitous footholds through boulder flats and narrow gorges. It was one of the toughest construction jobs of all time, but because the need for this life-line to Alaska was imperative, the impossible was accomplished and before the first of November, long convoys of Army trucks bearing vital military supplies were rolling over the 1,680 miles of miracle road between Dawson Creek, British Columbia, and Fairbanks.

The Alcan Highway is not completed. What has been pushed through is a serviceable road that could carry truck traffic during the winter the full distance from Dawson Creek to Fairbanks. Although the road is not completed, it emphatically is not a hazardous one-way trail that has been pressed into service. Since the first of August when the Army placed all contracting firms on the route of the "tote" road, removing them from the route of the PRA or commercial highway on which they had been working, many hundreds of miles of roadway were widened out to the full 36-foot finished width and many miles received their final surfacing of gravel and crushed rock. Sections of the present road narrowing down to a minimum width of 20 feet, as well as many steep grades and sharp curves, were scheduled for improvement this spring.

The basic standards for the highway are: rights-of-way 100 feet wide cleared through the forests; 36-foot roadbed; 6 to 1 slopes; a compacted fill, a 12-inch lift of pit-run material, an 8-inch lift of 2-inch crushed rock and a final 4-inch lift of 1-inch crushed rock. Gravel surfacing on the Alcan road runs 20,000 yards to a mile.

Although temperatures of from 30 to 50 degrees below zero halted most operations late in November, the gravelers at a hundred borrow pits and quarries along the highway started with the first real winter days to build up huge reserve stockpiles of crushed and graded rock and gravel for surfacing in the spring.

On the southern 300-mile sector of the Alcan Highway, many of the dirt movers operating under the Okes management contract prepared to spend the winter months overhauling equipment in preparation for the busy spring days, while the gravel and rock producers turned their attention to the stockpiles.

At the Southern Minnesota Construction Co.'s borrow pit near Fort St. John, this Pioneer crusher produced graded crushed rock for surfacing.

Preparing Surfacing Material

About 14 miles north from Fort St. John, in a borrow pit overlooking the broad valley of the Peace River, the Southern Minnesota Construction Co. of Spring Valley, Minn., in late November was averaging 60 yards of 1 and 2-inch

(*Concluded on page 52*)

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
Dept. C
36-40 11th St., Long Island City, N.Y.
Tel. IRonsides 6-8600

HE KNOWS HIS BUSINESS

Whether controlling the split second movement of 70 trains a day, or producing friction materials for industrial equipment, it's "know-how" that counts.

Raybestos knows how. That's why there is a Raybestos brake lining and friction *specially engineered* to meet the *exact* requirements of every make and model of machine that you operate!

Specify Raybestos—the friction materials that have proven *correct* and *dependable* for more than 37 years.

Fastest deliveries assured through your local Raybestos distributor. See him or wire us.

THE RAYBESTOS DIVISION *of Raybestos-Manhattan, Inc.*, BRIDGEPORT, CONN.

RAYBESTOS IS AMERICA'S BIGGEST SELLING BRAKE LINING

Raybestos INDUSTRIAL FRICTION MATERIALS

FOR SHOVELS • CRANES • HOISTS • TRACTORS & EARTH MOVERS

Increased Air Traffic In Post-War Period

(*Continued from page 2*)

an even greater expenditure for hangars, administration and other buildings, to be financed locally.

Air Traffic

Commercial airlines turned in a "miraculous performance" in 1942, according to Col. Edgar S. Gorrell, President, Air Transport Association of America, handling a 108 per cent increase in air cargo. This means that airlines flew 40,101,657 pounds of express and 40,096,554,805 pound-miles of mail, in addition to 1,398,042,146 revenue-passenger-miles in the same period.

Comparable figures for 1941, according to the same source, were 19,209,671 pounds of express, 25,801,137,783 pound-miles of mail, and 1,369,584,231 passenger-miles. To furnish a further basis for understanding the tremendous possibilities for post-war development, take a look back to aviation's pioneer days of 1926. In that year there was no express flown, and only 396,345 pound-miles of mail. The number of revenue passengers was 5,782, as compared with 3,768,892 passengers in 1941.

W. A. Patterson, President of United Airlines, is conservative and does not believe that aviation will supercede older forms of transportation such as the railroads and steamship lines. Air transportation, he contends, will augment them and aid in their development. Similarly we feel that highways and aviation will do much to benefit each other in the future.

Air transport will not be confined to planes, even larger ones than we have envisioned today, for experiments with towed gliders have shown great possibilities, although they are not expected to be used immediately. These gliders may be loaded at the air field, picked up by a plane in full flight, or released from a train of gliders behind a transcontinental plane to land freight, express or passengers at some intermediate airport.

The cost of air transport of passengers or goods will be an important factor in determining the increase in its use and the extent of construction of new air terminals, glider pick-up depots, and transfer stations. Mr. Patterson feels that in the field of passenger travel the airplane may well take over a major share of the volume. But the volume of domestic air cargo could increase one-hundred-fold and yet capture only one-tenth of one per cent of the freight ton-miles now carried by American railroads.

In normal times, transportation represents a real part of the price of goods, and this fact benefits all transportation agencies. Take, for example, the relative cost of freight transportation by surface and by air between Chicago and San Francisco. A freight train making two round trips between these cities in a month and carrying a total of 780 tons would have operating charges of $50,000. The present commercial planes hauling the equivalent amount of freight in the same period would show operating costs of $1,750,000 or thirty-five times as much as the freight train. Engineering advances, plus a hundred-fold increase in volume by air, it is estimated, might reduce ton-mile costs from the present average of 40 cents to 10 cents. This would still be many times that for surface transportation, whether by highways or by rail, which have ton-miles calculated in mills.

The mode of transportation which will acquire the shipper's dollar is the one which will provide the least expensive facility, taking both cost and time into consideration. Present air freight rates will have to be drastically reduced before they can compete with rail in less-than-carload lot freight. The "Flying Boxcar" of the post-war world will be able to rush delicacies that tickle the palate of gourmets or stimulate the appetites of invalids. They will carry much lightweight non-bulky freight which can stand the burden of higher freight rates. And finally they will require air fields of their own where the delivery from plane to store will not interfere with the speedy transfer of passengers from plane to office.

Present Airports Poorly Located

The location of an airport with respect to the city it serves has seldom received sufficient consideration. Air transport for transcontinental service definitely conserves time. But, when a short flight is taken, time saved through the use of air transport may be lost in reaching one's destination within the city. Any meadow big enough to land on, anywhere within 15 miles of town and less than an hour's drive, used to be satisfactory for an airport.

Tomorrow's air terminals will require greater areas and hence may be pushed farther from town. This disadvantage in the time element may be overcome by providing an express highway from the airport to and through the heart of the city. Igor Sikorsky offers his newly perfected helicopters as taxis from airport to rooftops of post offices, railroad stations, and even hotels. This remarkable flying machine can land on a roof no larger than your living-room rug, the 9 x 12 in the parlor. It can fly straight up, straight down, backward, forward, horizontally, remain stationary in the air, and be brought to an instant stop on

(*Continued on next page*)

MORE POWER FOR TANKS TODAY—
CHEAPER POWER FOR AMERICA TOMORROW!

AMERICA'S tanks pack a powerful push as well as a powerful punch. And more times than most people know, this push comes from a General Motors Diesel engine.

What's more, you'll also find these rugged, hard-working power plants in landing barges, patrol vessels, military trucks, construction tractors and many other wartime jobs where sturdy dependability is required.

They burn cheaper fuel and use less of it—operate with a minimum of attention.

Of course the needs of war are taking every engine that even our expanded production can make, but when peace comes America will profit —through low-cost power for many new applications.

So while now GM Diesels are adding strength to America's fighting arm, they will be one of the important contributions to better days after victory is ours.

New eras of railroading follow in the footsteps of war. Another new era of railroading is assured in the wake of this war. General Motors Diesel locomotives already are establishing new standards of transportation.

GM GENERAL MOTORS DIESEL POWER

ENGINES....15 to 250 H.P.....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

ENGINES..150 to 2000 H.P...CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

BAILY CONCRETE VIBRATORS

PAVEMENT VIBRATORS

Three types: *Vibrating screed*, full-width, propelled by hand-operated winch and cable or pushed ahead by finishing machine. Gasoline power plant.

Tubular internal, extending entirely across slab, mounted in front of finisher. Gasoline or electric power plant with flexible shaft drive.

Vibrating pan, full-width, carried by two-wheeled trailer behind any standard finisher. Gasoline or electric power plant.

STRUCTURAL CONCRETE VIBRATORS

1, 3, and 4 H. P. gasoline, air-cooled, 4 cycle motors; flexible-shaft drive; interchangeable vibrator heads lubricated for life. Wheelbarrow carriers.

Pioneers in Concrete Vibrators

BAILY VIBRATOR CO.
1539 WOOD STREET, PHILADELPHIA, PA

Construction Needs In Aviation Program

(*Continued from preceding page*)

landing. At present, general use of the helicopter is still definitely in the future. Therefore, some other method of time-saving transportation must be provided for the traveler from an airport to the business center of a city.

An analysis of airport locations in terms of highway-travel time from plane to city office for a number of Texas cities was presented by Professor Frederick, University of Texas, in *Texas Parade*, and in actual miles for all airports in the United States. This study shows that most of the airports used by the airlines in the United States are within 6 miles of the center of the communities they serve. Only five of the fifteen airports serving larger communities are as near their center as 6 miles. Five airports serving communities of 500,000 or over are from 6 to 10 miles from their centers, four are from 10 to 15 miles, and one is between 15 and 20 miles.

In the study of travel time between the center of the city and the airport, Professor Frederick presents the figures for a number of Texas cities. The airport serving Houston is 10 miles from the business district and requires 40 minutes travel time. In Dallas the airport is only 7.5 miles away but also requires 40 minutes travel time. Professor Frederick points out, "While much is being done to improve the airports themselves, not much has been done to change airport locations. In many cases nothing can be done, except to lessen distance and travel time between business districts and airports by highway planning and construction. This must be a part of post-war highway planning in and around all towns of any size."

The CAA Program

In 1939, the Civil Aeronautics Administration made a survey and report to the Congress on the national airport situation. As a result of this survey and report, a tentative national airport plan was conceived which embraced a total of 4,000 airports in the continental United States.

The current program of the CAA has been under way since late 1940 and, to date, approximately $399,000,000 has been appropriated by the Congress and allocated or encumbered for the construction of public airports essential to the national defense. Projects selected for the program must receive the approval of a Board composed of the Secretaries of War, Commerce, and Navy. During this time certain modifications in this tentative national airport plan have been necessary to satisfy the requirements of the Army and Navy for the use of public airports, inasmuch as the airport development was undertaken primarily with the objective of providing airports which would be useful to national defense as well as civil aviation.

In a statement on the CAA program to CONTRACTORS AND ENGINEERS MONTHLY, Charles I. Stanton, Administrator of Civil Aeronautics, said, "The tentative national airport plan conceived in 1939 will require some modification to make it satisfactory for the post-war period. At the present time it is very difficult to anticipate the number of airports which will be available for civil aviation after the war, as it is not known at present which airports built by the War and Navy Departments may revert to public use and which public airports now occupied by the military may be retained by those branches of the service. These factors are important ones in formulating a post-war airport development program and will, of course, require consideration.

"Airports falls into four categories or classes, and as of April 1, 1943, there were in this country 1,238 airports in Class I (possessing unpaved runways 1,800 to 2,500 feet long, with landing strips 300 feet wide); 905 Class II airports (Class II having paved runways 2,500 to 3,500 feet in length with 500-foot landing strips, and pavement widths 100 to 150 feet); 413 airports in Class III (with paved runways 3,500 to 4,500 feet in length and 150 feet wide and 500-foot landing strips); and 362 Class IV airports (with paved runways 4,500 feet or longer). This is a total of 2,918 classified ports."

Post-War Programs

A number of cities are already planning their post-war airport programs, and at least one state is distinctly air-minded. The Minnesota Aeronautics Commission, though lacking funds, proposes designs for Class IV airports at twelve cities within the state: Mankato, Brainard, Winona, Austin, Worthington, Grand Rapids, Detroit Lakes, Red Wing, Crookston, Fergus Falls, and New Ulm. Up until recently, Minnesota really had only three airports, far behind in number in comparison to states much smaller in size. These airports are at Minneapolis, St. Paul, and Rochester. Since then several other airports have been started, namely at Duluth, Hibbing, and Eveleth which will be completed shortly. Other than these, there are approximately 45 fields with sod surfaces, most of them either improperly located or without sufficient landing area. An organized program, a properly financed state aeronautics commission, can be of great help to the cities in any state in developing plans today, so that its major cities will not be way-stations on a statewide airways network in the future.

Minneapolis and St. Paul in Minnesota have already reached an agreement on a bill to be presented to the State Legislature to create a huge joint airport for the Twin Cities. The bill provides for a joint commission composed of four members from each city with the ninth member from another county to be appointed by the governor of the state. It has already been agreed that the new commission will take over the operations of both the Wold-Chamberlain and Hol-

(*Continued on page 32*)

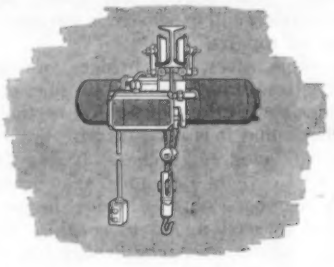
"TIME"

It softens hatred, heals wounds and proves that "FLEX-PLANE" ribbon joint is O. K. and maintenance near zero.

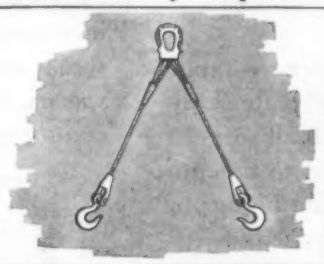
FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO, U. S. A.

Salient POINTS IN CMP Re: Buying Wire Rope

WHEN BUYING WIRE ROPE FOR INCLUSION IN A PRODUCT YOU ARE MAKING,



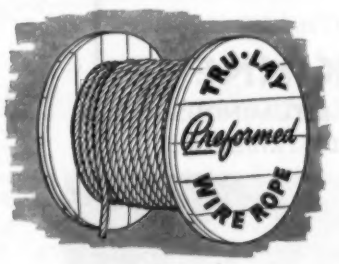
REMEMBER: Wire rope is a Controlled Material • Your orders should bear the abbreviated allotment numbers—such as: W-8-20 • Preference ratings on orders bearing allotment numbers are valueless. Wire rope producers are required to fill authorized controlled materials orders without regard to preference ratings • The allotment number on a wire rope order must show the actual month of delivery and *not* the quarter in which delivery is required.



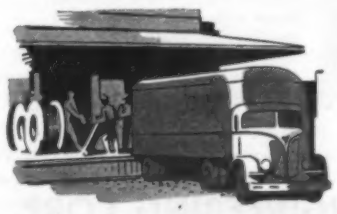
WHEN BUYING WIRE ROPE ASSEMBLIES,

REMEMBER: Assemblies consisting of wire rope and fittings are Class B if they are air-borne, but Class A if they are not • If Class A, you must furnish us with an allotment of the steel required for the wire rope, and for the fittings if they are also class A • If Class B, you must not furnish an allotment of steel for either the fittings or the rope • In either case, your orders must bear allotment numbers or they cannot be considered delivery orders for products containing controlled material.

WHEN BUYING WIRE ROPE FOR MAINTENANCE, REPAIRS, OR OPERATING SUPPLIES,



REMEMBER: Subject to the limitations imposed upon you by any "P" order under which you may be required to operate, and provided you produce a product or are engaged in any business in Schedules I or II of CMP Reg. 5, the symbol MRO on a wire rope order, followed by any appropriate certification, makes your order an authorized controlled material order, and • A preference rating is not required, because wire rope is a controlled material • Just be sure to observe the quantity restrictions stated in Par. (f), CMP Reg. 5.



WHEN BUYING WIRE ROPE IN SMALL QUANTITIES FROM WAREHOUSES,

REMEMBER: You don't need an allotment number or a preference rating for wire rope if • 1—You order in amounts of $10 or less, • or 2—If you don't buy more than 4,000 pounds per calendar quarter, or • 3—If you are authorized to buy it under Food Production Order 3 • Just be certain that you don't exceed the inventory limitations stated in CMP Reg. 2 • Certify your orders as stated in CMP Reg. 4.

AMERICAN CABLE DIVISION Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

(May 20. 1943)

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Welding vs Riveting For Bridge Repairs

Savings by Welding Figure $7 per Railroad Mile Based On Experience of the Erie Over Long Period

By A. M. KNOWLES, Assistant Engineer of Structures, Erie Railroad Company, Cleveland, Ohio

✦ SALT brine which drips from refrigerated cars loaded with perishable goods is much more destructive of protective painting and of the steel below track level in railroad bridges than ordinary weathering. Although extensive research and experimentation with many types of paint and other protective coatings have been made, nothing has been found effective for a reasonable time against the destructiveness of the brine. Therefore, the loss in section of all or parts of bridge members, such as stringers, floor beams, deck girders and trusses and even the lateral bracing, becomes so great in time as to materially reduce their strength, resulting in excessive and unsafe unit stresses under the locomotive and train loading which they carry.

Any repairs made to these corroded and deteriorated bridge members must be carried out with as little interruption to railroad traffic and train schedules as possible. The heavier the traffic, the more difficult and expensive is the application of repairs.

In some cases, old bridges are so highly stressed under modern traffic, not considering any loss of section of their members, that it is necessary to replace them with modern bridges. It was the custom 15 years or more ago, when many members of the bridge became reduced in section, not to consider extensive repairs or strengthening but to renew complete bridges.

If repairs were made, deteriorated parts or whole members of a bridge were renewed. This sometimes required the use of extensive falsework and in all cases there were many rivets to be cut out, deteriorated parts removed, new parts installed and re-riveted. When complete reliable records of shop details of steel work were available, the new members or parts of members could be prefabricated and a fairly good fit would result. Sometimes, however, unreliable or no records were available and the repair steel was either brought to the job unpunched and placed on the old parts retained as a template and drilled to match the holes in these old parts or, if field measurements of rivet spacing were made to permit prefabricating new parts, the latter method frequently resulted in much mismatching of holes.

In early bridge construction the location of punched holes in structural iron and steel on exact gage lines and spacing was less accurate than is the practice in more recent years. Rivet heads also were not always driven concentric with their shanks and if they are unevenly reduced by corrosion it is extremely difficult to determine accurately the spacing of rivet holes before rivets are cut out. These methods were slow but when electric arc welding came into accepted use the repairing and strengthening of old bridges was simplified and expedited in many respects.

Stringer Repairs

Stringers are usually made up of I-beams or a web plate and two flange angles, top and bottom, with or without cover plates. The effect of brine extends over the upper surfaces and is most severe on the outer edges of the top flanges. When no cover plates exist, the width of flanges is materially reduced and the edges become wedge shaped and scalloped. Where cover plates exist, the deterioration affects both the plates and the outer edges of the angles and frequently excessive thickness of rust is built up between the cover plates and angles and extends to the rivets connecting them. In such cases the rivet holes are frequently enlarged and the heads and shanks of rivets are reduced and become ineffective.

There are two common ways of making repairs, using the riveting method, when there are no cover plates. In the first method, rivet holes are drilled in the horizontal legs of the old angles to match prepunched plates and then the plates are riveted to the angles. This can be done only if the reduction in the angles, both on upper surfaces and edges, is not too great. Tight rivets cannot be driven when the angle surface in contact with the plates is pitted very irregularly, and the width of the remaining flange angles must be sufficient to provide adequate edge distance for the rivets.

Usually the track rails are over the lines of rivets or nearly so which makes it necessary to move the rails to obtain good holes and a good riveting job.

The second method is to renew the top flange angles, cutting out and redriving rivets connecting them to the web plates. This also requires the removing and replacing of angles con-

(*Continued on page* 60)

Plan Ahead for

KINNEY
BITUMINOUS DISTRIBUTORS

We're sorry that the urgent requirements of war production prevent our accepting orders **now** for Kinney Bituminous Distributors. When the war is won, these reliable distributors . . well known for 33 years . . will again be available, designed for new road building methods and with further improvements for most efficient and economical operation. Plan now for the future . . . and remember KINNEY.

KINNEY
MANUFACTURING CO.
3531 Washington St., Boston, Mass.

BRANCH OFFICES
New York Chicago Los Angeles
Seattle Philadelphia San Francisco

The Care and Feeding of Rock Crushers

No. 4 of a series of advertisements published in the interests of national economy and to aid those users of crushing equipment unable to secure new units during the emergency.

What Operating Speed for Maximum Output?

As with a gasoline or diesel engine, there is an ideal speed at which crushers will provide maximum efficiency. Operating below that range may provide increased crushing efficiency at the expense of volume; and operating above that range may provide decreased crushing efficiency and decreased volume, because of choking and premature wear of the jaws and other parts.

Crushers should be operated within the range of speeds indicated on the name plate. Universal engineers are familiar with all sorts of rock, ores and slags and are glad to be consulted where special cases indicate higher or lower than standard operating speeds.

When a crusher is run too fast it will not grip the rock. This results in slippage and causes rapid wear of the jaws. Do not operate on the theory that every revolution of the eccentric shaft gives a crushing blow and, therefore, increased capacity.

There is a peak speed which, when exceeded, causes decreased production. Therefore, the increased speed over the peak is wasteful and wears out equipment much faster. *At high speeds, rock floats in the crusher and jaws cannot grip it readily.*

When a crusher is run too fast, the jaws tend to squeeze material back up into the feed opening. When run at the proper speed, the jaws take a big bite at the top (A) and a powerful finishing bite at the bottom (B) — two crushing blows with each revolution of the eccentric shaft.

The "Overhead Eccentric" crushing principle, pioneered by Universal, gives maximum production.

We've earned this WAR BOND buyer's flag to help keep "Old Glory" flying!

UNIVERSAL ENGINEERING CORP.
Formerly Universal Crusher Co.
620 C Ave. West Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

A curve outlined by painted posts and reflector buttons on each side facing traffic. Note also the delineation of the curve by trees.

Curve Delineation And Signs in Texas

Old Guard-Rail Posts Used as Guide To Motorists on Sharp Curves; Signs With Reflector Buttons Studied to Determine Best Spacing of Buttons

(*Photos on page* 68)

✦ SALVAGED guard-rail posts, released from their former service by the flattening of highway slopes, have been pressed into another service on Texas highways. Curves that are flat and not visible for 500 feet are now delineated by posts set 50 feet apart on the outside of the curve 8 feet from the paved roadway. The posts, protected with aluminum paint until that became no longer available, are now painted with a grayish-white cement-base paint and a band of black paint 6 inches wide about 8 inches from the top of the post. A reflector button is centered in the black band on each side of the post.

The use of these posts is regulated by the sight distance and the hazardous character of the curve. If the curve is only 1 or 2 degrees and is visible for more than 500 feet, the posts are omitted. They are used on all other curves and if the curve is not visible for at least 500 feet, a standard reflectorized curve sign is also installed. If the curve is unusually hazardous, the standard curve sign is preceded by a "Slow" sign with reflector buttons at a distance of 500 feet.

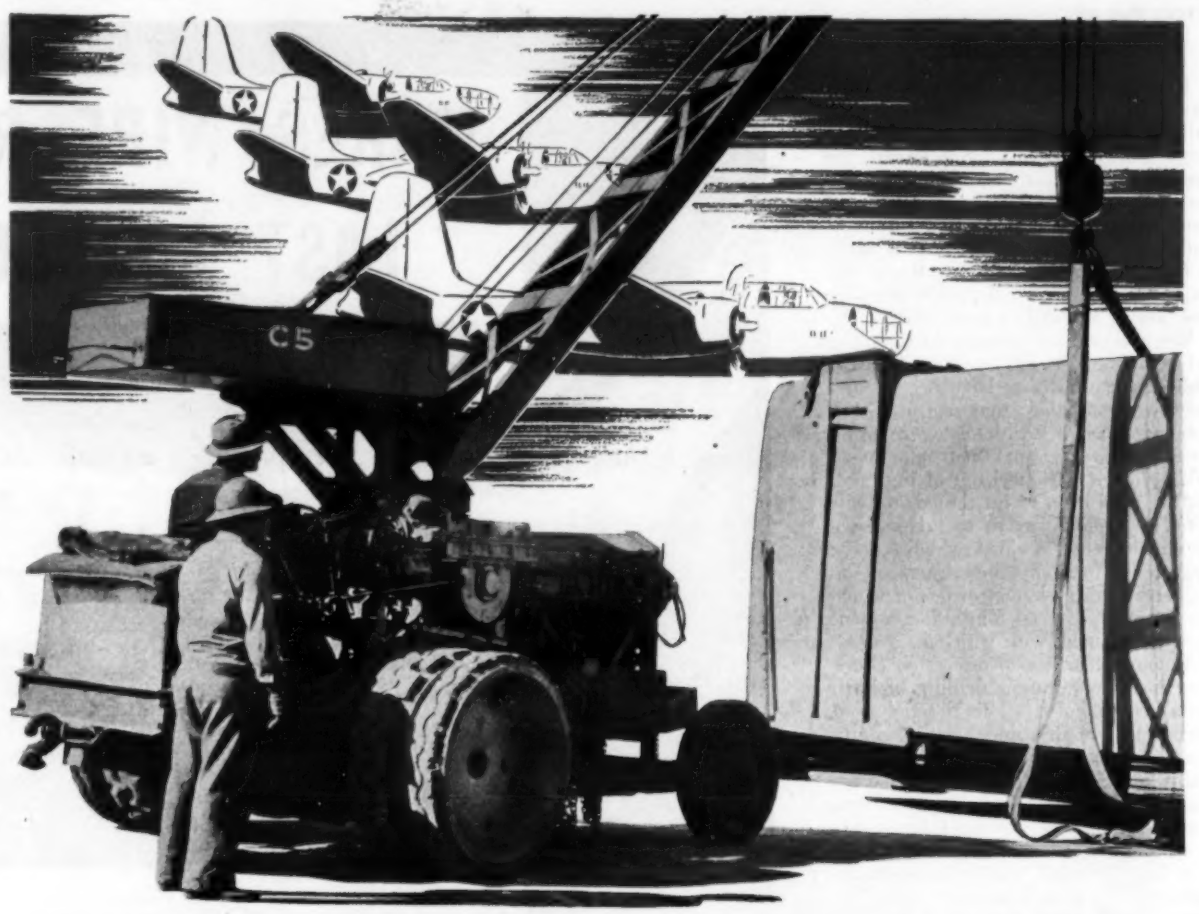
The salvaged guard-rail posts cost less than $1 each as placed in the ground, painted and with the reflector buttons. One reflector sign costs a minimum of $12 and two of these are needed at each curve. Thus the use of a few posts saves a considerable investment in the signs. Where used with signs, the posts have added a greater degree of safety as they are visible for a longer period to the motorist.

The posts with the buttons are also used as lead-ins to bridge hand-rails as the roadway is invariably wider on the open road than at the bridge because of the elimination of the shoulder width in the construction of the bridge. This margin of safety, eliminated in the design and construction of the bridge, must be provided by the Maintenance Division in the line of reflectorized posts which prevent the driver heading straight for the parapet wall. The gradual leading in of the traffic has prevented a great many accidents at bridges in Texas.

A careful study of the spacing of reflector buttons on letter signs in Texas has resulted in greater ease of reading instead of the blur that so often prevents the driver of a car at night getting a clear impression of the meaning of the sign in a sufficiently short time. With a very close spacing of the buttons they run together and it is not until the car is close to the sign that it is possible to read it. To determine the best spacing for effective service, the Maintenance Engineer, M. B. Hodges, had three identical letters "S" made on boards, with one outlined with the more customary double line of buttons spaced about 4 inches apart; then the second with a single line through the center of the letter, spaced 4 inches apart; and the third a single line in the center spaced 3 inches apart. These were set up at the highway garage and careful readings noted at varying distances at night while they were illuminated by the headlights of a single car at varying distances. The single line of buttons spaced 3 inches apart for a letter "S" 18 inches in height was the most legible so that was adopted as a standard. This has saved a considerable investment in reflector buttons, made the present stock last longer, and made the signs more readable and effective for the motorist they are designed to serve and protect.

One of the large "Curve" signs, in which reflector buttons have been placed, which are used on the highways in Texas. These signs have been very effective both day and night.

Carey Elastite EXPANSION JOINT
Standard in Concrete Construction for 31 Years
ECONOMICAL and EFFICIENT
Asphalt Joint
Fiber Joint
Sub-Grade Felt
THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO



It Takes a Crane to Put Up This Umbrella

Wherever America has been able to maintain an umbrella of aircraft in the sky, American soldiers, sailors and marines have demonstrated their ability to beat the enemy on earth and ocean. Under that umbrella they advance to victory. Shelter of that umbrella saves lives of our sons and brothers.

First phase of raising the umbrella is to build planes. To build them faster with available manpower this Case-powered crane assists with assembly at an important airplane factory. It is of the full-circle swinging type, capable of lifting parts into place with speed and accuracy. Case-powered cranes are also built in the simple, sturdy non-swinging type, especially suited to heavy lifts and longer carries. Both types are available in single-drum and double-drum styles.

Not only for cranes, but for loaders, snow-plows, rotary brushes and all manner of mounted equipment, the extra strength and stability of Case industrial tractors take care of added burden and permit peak performance. The torque characteristics of Case engines, whereby they lug as lustily below half-speed as at full rated speed, aid in gentle handling and accurate work, especially helpful in exacting assembly operations.

Of special value in times when schedules are swift and round-the-clock operation imperative is the extra endurance for which Case tractors are known. This endurance comes from a hundred years of experience in building out-door power machinery.

★ ★ ★

Case industrial tractors and mounted equipment are available to government agencies and private plants engaged in war work. Case engineering service is freely offered to such agencies and companies; also to others looking toward future developments that involve tractor power. If you have such power applications in mind, you are invited to get in touch with us. J. I. Case Co., Racine, Wis.

CASE Power ★ ★ ★ ★

JOB-PROVED SEES THINGS THROUGH

Proper Care Will Lick Rock-Drill Troubles

(*Continued from page* 14)

oil passes through the long hose to lubricate the drill properly. When first starting up a machine with a line oiler and a long hose, therefore, the operator should continue to put oil in the lubricator of his machine, or into the air inlet, so as to insure that the drill is properly oiled until such time as the line oiler is feeding through an ample quantity of oil.

It is a good idea to check the exhaust of a drill frequently for a mist of fine oil particles as this indicates proper lubrication of the drill. Many operators flush the drill out occasionally by pouring a small amount of kerosene into the air inlet, run the drill for a short time, and then pour a small amount of the correct lubricant into the same inlet. This is analogous to the flushing of the crankcase of an automobile, when using a very thin oil.

Care of Drills

In order to insure the best results from any drill it is well to disassemble each drill at regular intervals, varying from every shift or so to once a month, depending on conditions, clean and examine the parts, and then thoroughly oil them when reassembled. When there is not time for thorough cleaning, it helps at least to pour gasoline into the air inlet, turning on the air for a few seconds, then giving the drill a good shot of oil.

Worn chucks are a cause of considerable trouble. Do not operate any drill with chuck parts that have become unduly worn as they may cause piston breakage. A chuck which is worn, either generally oversize or "bell mouthed", will hold the drill steel out of line, permitting the piston to hit the edge of the shank in such a way as to break down the striking end. A chuck which is worn large tends to round the corners of the drill steel. A shank, the corners of which are rounded, if used long enough, will spoil each chuck with which it is used.

A common cause of excessive chuck wear is the continuous drilling of horizontal or flat holes. This practice is of course a necessity under some conditions. One rock drill company suggests that, where a hand drill is to be used for many flat holes, a 1-inch hex steel with a collared shank, 4¼ inches long, should be adopted.

A few "Don'ts" that will probably save you a great deal of trouble are these: Don't pound the drill if the steel is stuck. It is much better to hit the stuck steel to loosen it up. Remember your drill is a precision instrument and must be protected from abuse. Don't pull up drill steel while the machine is running at high speed. Don't install new parts in conjunction with badly worn parts as neither will work satisfactorily.

Licking Your Troubles

A few troubles which are met with in drills and the probable cures for the trouble are included in the following paragraphs. They are the result of plenty of field experience of compressed-air men who know their jobs.

A honed or scored piston is probably due to lack of lubrication or dirt and foreign matter in the air line. Be careful to keep all working parts clean and follow the manufacturer's instructions as to lubrication.

Improper lubrication or foreign matter in the air line will also cause sluggish action of the drill. Clean all the working parts with kerosene, then relubricate with a light oil.

If the drill steel is not rotating properly, it is probably due to worn out or stuck pawls, weakened pawl springs, a worn rifle nut or rifle bar. The cure is to replace the worn parts, clean, lubricate and reassemble the drill.

Fogging around a drill is usually due to too much water in the air line or conditions of high humidity in the working area. The best cures are to install traps in the air line and drain the receiver and traps frequently. Fogging is also caused by an excessive amount of oil. Line oilers are adjustable for the amount of oil released into the air line; be sure not to get too much or too little.

If your drill operates erratically, it is usually due to dirt, bits of rubber from the air line, etc. It may also result from using a bit after the gage is badly worn, causing the bit to bind. Make sure that the air line and strainer, if one is used, are cleaned out; also dismantle, clean, reassemble and relubricate the drill.

Slow drilling is often caused by improperly made or badly worn shanks which, in turn, prevent the piston from transmitting the full force of its blow to

(*Continued on next page*)

There are three forces constantly at work to destroy wire rope in use,—(1) wear, (2) fatigue and (3) corrosion. The use of LUBRIPLATE 130-AA as a wire rope lubricant has proven so effective in combatting them that rope manufacturers are recommending it for the toughest rope jobs.

LUBRIPLATE 130-AA has enormous film strength and adhesiveness. Hence it is not squeezed out under the terrific wire rope internal pressures. It is impervious to water, moisture and most industrial fumes. LUBRIPLATE therefore prevents rust and corrosion. By doing a better lubrication job LUBRIPLATE permits the strands and wire to work with minimum friction which materially reduces one of the causes of wire fatigue.

These claims for LUBRIPLATE are backed up by unsolicited testimonials of wire rope users who say that it has licked their wire rope problem. LUBRIPLATE lubricants range from the lightest oils to the heaviest greases. Each is an outstanding lubricant that will do a specific job better. Let us send you facts and figures about LUBRIPLATE lubricants. Write today.

LUBRIPLATE DIVISION
FISKE BROTHERS REFINING COMPANY
NEWARK, N. J. **SINCE 1870** TOLEDO, O.
WRITE FOR THE NAME OF THE DEALER NEAR YOU

Greater Efficiency From Your Drill Steel

(*Continued from preceding page*)

the drill steel. Neither short nor long shanks receive the full force of the piston blow. With short shanks the front cushion absorbs part of the blow and long shanks cause short stroking of the piston. Check your drill steel shanks for correct dimensions as furnished by the manufacturer of your drill. When the drill does not perform satisfactorily, it is often due to worn parts in the rotating mechanism. Check this by inserting the steel in the chuck, turning the drill steel by hand, and then check for back lash.

When the complaint comes from a new drill man that a drill just doesn't run right, it is a pretty good idea to check all the nuts, bolts and oil plugs, and particularly the side rods. If these are permitted to work loose, there is excessive play between the parts. This means early wear and loss of air as well. Some steel pullers are so constructed that it is easy to take up the looseness which may be present when the springs have taken a set. Keeping all these parts tight will make the machine last longer.

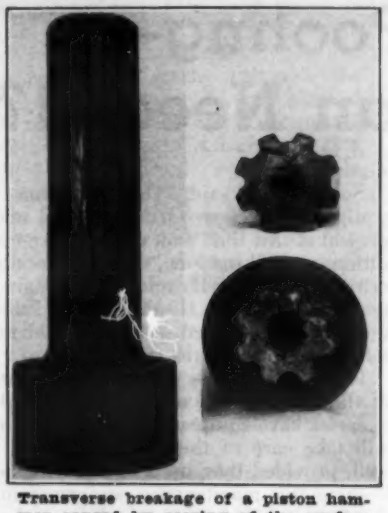
In deep holes, you can cut faster by blowing the hole often, as the bit will then work on fresh rock, and not take up its energy while pounding up the cuttings in the bottom of the hole. Blowing the hole often also avoids the chance of getting your steel stuck. A little trick that saves a lot of trouble is running the drill upside down on its handle when impacted cuttings have plugged the drill steel hole. This is almost sure to loosen them.

Even though it does take a minute or two to change from a short starting steel to a longer one, it is a much safer method than to try to start with a long steel that makes it almost impossible for the driller to get the hole started straight.

Watch Your Drill Steel

"Drill steel is drill steel" according to some drillers, but unless you keep your drill steel sharp, and with a clean air hole, you are in for trouble. Shanks must be maintained at the proper length, either 3¼ or 4¼ inches, in order to promote maximum cutting. They must be correctly shaped and properly tempered. Be sure that the striking face of your shank is square and flat, free from cracks or spalls, and with the corners slightly beveled to an angle of 45 degrees. The end where the piston strikes must be sufficiently hard to stand the hammering, but still soft enough that a new file will take hold. Obviously the shank end must be less hard than the striking end of the piston, yet it must not be so soft as to spread under the hammering so that the steel cannot be pulled out of the chuck.

If the end of the drill steel is rounded, the area of contact between the striking face of the piston and the shank end of the drill steel is reduced. Where rounding has become excessive, the contact area may be reduced to as little as one-quarter of the original striking face. This means that the full force of the piston blow is concentrated in a small area and results in rapid cupping of the striking face of the piston with resultant chipping. Worn shanks also result in a distinct loss of blowing power. In most



Transverse breakage of a piston hammer caused by scoring of the surface may result from failure to use the proper high-film-strength lubricant.

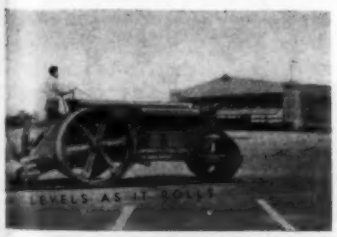
rock drills of the hand-held type, the air for blowing the hole is taken from the front end of the cylinder, being permitted to flow through the piston flutes into the space just in back of the chuck when the piston is near the rear position of its stroke. It is easy to see that if the chuck is badly worn, much of the air which is intended to blow out the cuttings in the hole will escape to the outside air through the space between the drill steel and the inside of the chuck.

Not infrequently drillers report that the chuck is so worn that the steel turns around in it. This can mean that the chuck is badly worn or that the steel is too small because it is worn at the corners, or a combination of both. A shank which is smaller than standard across the flats, or which has rounded corners, will soon wear out the chuck, and if the chuck is not removed, will round the corners of all other drill steels used. Make sure that the hex shanks are all of standard size.

Always quench shank ends in oil and not in water as water tempers them too hard. When hard shanks are used, par-

(*Continued on page 48*)

TAKE GOOD CARE OF YOUR



HERCULES ROAD ROLLERS

Keep the engine and all moving parts clean, well lubricated and adjusted. Send for HERCULES Care and Operation Bulletin H-3713.

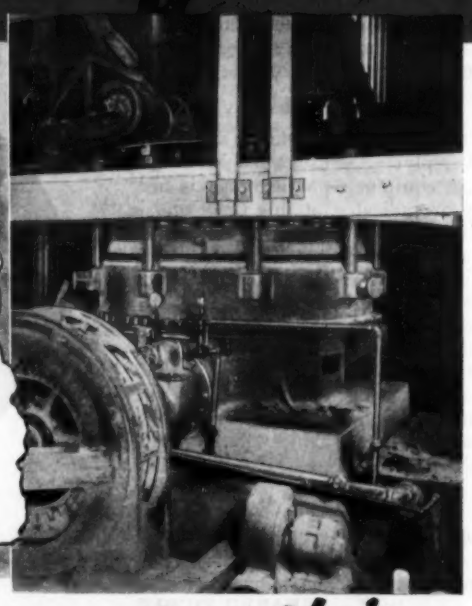
THE HERCULES COMPANY MARION - OHIO

"We are sending you under separate cover, one eight pound hammer head and two picks which passed through our Secondary Crusher on Sept. 18, 1942, without apparently doing any damage.

This is such a remarkable demonstration of the power and efficiency of your 48" TELSMITH Gyrasphere Secondary Crusher, that we feel you should have these specimens as proof of the statement. This machine at the time was set for one-half inch discharge, which makes the demonstration more remarkable.

We get a large percentage of tramp iron * * * In the past this was a source of grave trouble but since installing your machine tramp iron doesn't bother us."

NAME ON REQUEST



they didn't even stop this

TELSMITH

Gyrasphere SECONDARY CRUSHER

A silent, skulking saboteur — Tramp Iron constantly menaces your production. Get the insurance against shut-downs of Telsmith's *spring relief*. The crusher's concave bowl is backed by heavy springs, adjustable as to compression. When tramp iron gets in, it causes undue pressure in the crushing bowl. The springs let the concave bowl *tilt* at the point of stress. The pressure is relieved. The concave resumes its normal position. Crushing goes on as usual. The same relief is afforded when crusher bowl is packed by fines. This means a greatly increased capacity in fine crushing, continuous operation and minimum upkeep. *For the whole story, get Bulletin Y-34.*

Y-3

SMITH ENGINEERING WORKS, 4014 N. HOLTON STREET, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee — Concrete, London

Room 1604—50 East 42nd St. New York City; 211 W. Wacker Drive Chicago, Ill.; 713 Commercial Trust Bldg. Philadelphia, Pa.; 19-21 Charles St. Cambridge, Mass.; G. F. Seeley & Co. Toronto, Ont.; Mines Eng. & Equip. Co. San Francisco—Los Angeles; Brandeis M. & S. Co. Louisville, Ky.; Charleston Tractor & Eqpt. Corp. Charleston, W. Va.; Roanoke Trac. & Eqpt. Co. Roanoke, Va.; Clift L. Priester 911 S. 3rd St., Memphis, Tenn.; Wilson-Woesner-Wilkinson Co. Knoxville and Nashville, Tenn.

Equipment Pooling— Is the Plan Needed?

State Highway Department Reports Indicate Little Need for Pooling; Repair Parts Will Solve Problem

✦ RECENTLY the War Production Board announced a plan for equipment pooling to solve the problem of highway construction and maintenance equipment shortages. In spite of the fact that the construction-equipment industry is still producing at its peak, almost the entire volume is going to the Army and Navy, leaving practically none for use by civilian agencies in this country.

This pooling plan is divided into two parts: one suggests pools of contractors' equipment administered by the Construction Machinery Division of the WPB and from which any contractor who gets a job may rent the machines needed to execute the contract; the other, state pools of road equipment owned by state, county and local governments under the Governmental Division of WPB which has asked each state highway commissioner to study this proposal and suggest a suitable plan for his state.

To secure the latest information on state highway departments' reactions to this plan and on any progress being made in setting up such equipment pools for governmental units, we wrote to the forty-eight state highway departments, asking each the following four questions: 1. Will pooling solve the maintenance-equipment problem in your state? 2. Are your counties and/or towns favorable to pooling? 3. What rental schedule is used for pooled equipment? 4. Have you gone far enough with pooling to be able to report any tangible results in maintenance or snow removal? We received forty-five replies.

Is Pooling Necessary?

Of the forty-five state highway departments replying, not one believed that such an equipment-pooling plan is necessary or indicated at this time, and a number of them expressed doubt that such a plan would solve the problem, if the need arose, although several stated that it might help somewhat.

The Ohio Department of Highways reported, "Ohio has not yet gone very far into the problem of pooling of equipment and from our experience up to the present, we do not believe that pooling is necessary. Our problem in this state arises more from a shortage of replacement parts than from a lack of equipment. We know of no cases where work has been held up because of equipment needs."

South Dakota said, "The maintenance-equipment problem in this state is not critical at this time and, unless war conditions prevail too long, there will be no critical situation with reference to maintenance equipment. However, should the duration be extended, pooling would to a large extent solve the problem."

In Kansas, it was reported that most of the counties and other governmental agencies have equipment on hand which will take care of their problems fairly well, provided they use extreme care in keeping this maintenance equipment in the best possible repair, and from the Iowa State Maintenance Engineer comes the statement, "Frankly, I do not believe we have a very serious maintenance-equipment problem in this state. By that I mean that we do not need any new equipment for state, city or county maintenance if we can get the necessary repair parts, and particularly cutting edges, for the equipment we have." The Highway Commissioner of New York State reported, "I do not know of any necessity for pooling ordinary road machinery in the state, as I believe all municipalities have ample equipment to do the restricted amount of work which can be done under existing wartime conditions."

From Wyoming comes the reply, "There is no maintenance-equipment problem in Wyoming and if there was we doubt if a formal pool with a lot of red-tape paper work would help. We will handle the situation, when and if it arises, informally, and we know that we will be able to keep the roads maintained and to give the counties and cities any assistance which they may require and which we find absolutely essential."

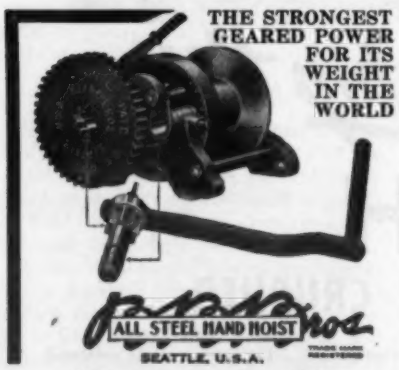
Will Pooling Solve Problem?

Although there is a unanimity of opinion that there is no existing problem in regard to the amount of maintenance equipment at the present time, no one can foretell the length of the war or foresee the problems which may arise before it ends. In looking forward to such possible problems in the future, a few states believe that pooling will help, while others fail to see any benefit to be derived from such a plan.

California reports, "Realizing that the present scarcity of road building and maintenance equipment will probably continue for the duration of the war, we believe that a 'pooling' plan is our only hope of continuing adequate maintenance of essential highways and streets.

"The plan as now proposed, we believe, will be satisfactory as soon as the Federal Government issues directives to its participants so that the coordinator will be able to get results. As pointed out by the Federal Government, the state highway departments, because of their wider knowledge of the transportation system of each state, are probably in a

(*Continued on page 44*)



THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

Beebe Bros. ALL STEEL HAND HOIST SEATTLE, U.S.A.

Compact—Powerful—Safe

STANDING ROOM ONLY FOR DURATION

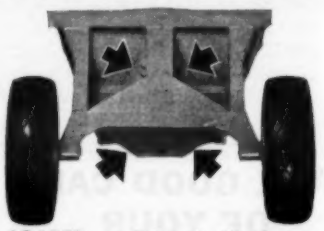
Beebe Bros. All-Steel Hand Hoists carry the highest resale value of any piece of equipment in the world. If you have one not in use, sell it. Many more than are available are urgently needed in the win-the-war program. Thanks.

BEEBE BROS.
2724 6th Ave., So., Seattle, Wash.

Here's How
The Heil Bottom Dump Trailer Wagon
Sets New Records
for Speed and Hourly Production

Heil engineers achieved this remarkable result by making new use of two old, proved principles of design — the clamshell principle, and cable control. The familiar clamshell is *opened* by power, *swings closed* by gravity. The operator dumps his load all at once or a little at a time, as he prefers — under complete control. And that is *exactly* what he does with this new Heil unit — the wagon that spreads like a cable scraper, that turns at will off the windrow because there are no doors dragging in the dirt, that dumps in 2 seconds and pulls away in a flash. High-clearance doors interlocked, completely synchronized, fast and positive in action. Heil Cable Scraper interchangeable on the same power unit. Investigate! Plan now for the bonus performance that makes you a stand-out against any competition. Write for bulletin. 8-11

New, revolutionary clamshell-type bottom-dump doors-power-opened



LOADED — "clamshell" closed

UNLOADING — doors raised, completely clear of the dumped load

Dumping clearance of 35 inches with doors wide open! Doors operate on trunions *outside* the hopper body. When the dumping doors are pulled open by cable power, the doors *swing up alongside the hopper* — out of the way. (Minimum clearance with doors closed, 26"; rear axle clearance, 39"). Patented construction.

The HEIL Company is engaged in all-out war production for Victory

THE HEIL CO.
GENERAL OFFICES • MILWAUKEE, WISCONSIN

C. & E. M. Photo
A well-maintained gravel and tar shoulder on U.S. 4 in New Hampshire.

Shoulder Maintenance On New Hampshire Roads

On the New Hampshire state highway system, the shoulders of concrete roads are built 3 feet wide of gravel and are treated with tar for 2 or 3 feet, depending on the traffic intensity on the particular highway. The initial treatment is 0.4 gallon per square yard, followed by sanding, and then a second application of 0.2 gallon per square yard similarly sanded. After this a treatment of 0.2 gallon per square yard is given every two or three years.

New Service Manual For Diaphragm Pumps

A complete operating and maintenance manual on diaphragm pumps, covering fully the installation, operation and maintenance of Novo Model AD units, has been prepared by the Novo Engine Co., 216 Porter St., Lansing, Mich., primarily for the War Department, but is available to anyone interested in the proper operation and maintenance of this particular model pump. The manuals are published on both the 3-inch and 4-inch sizes, and are written in simple language, easily understandable by even an inexperienced operator.

The books are divided into three sections: 1. An operator's manual giving the kinds of jobs best handled by this type of pump, the proper method of installation, lubrication charts, things to watch out for and to check, minor repairs that can be made on the job, such as changing diaphragms and valves, clean out, etc.; 2. A section on maintenance showing how to perform the more intricate repairs and adjustments that would be done in a repair shop. Exploded views show every part right down to the nuts and washers individually and separately but in the proper order that they go into the assembly; 3. This section is comprised of parts lists, tabulating every part and illustrating it with exploded views, and in its proper order and with the use of reference numbers coordinated with the parts numbers and descriptions in the tables.

Readers may secure these manuals free by writing direct to Novo, specifying the size of pump and referring to this review, or from the Novo distributor in their territory.

SAVE 50% ON FUEL AND WAITING TIME when Heating and Melting TAR & Asphalt
USE AEROIL THE FAMOUS
HEET-MASTER
AEROIL BURNER CO., INC.
5775 Park Avenue, West New York, N. J.
Chicago San Francisco Dallas

Salvaged Steel Used In California Bridges

(*Continued from page 7*)

in good condition and serviceable for many years, they are too light to carry full legal loads, and frequently this condition restricts the service on many miles of highway. At present, many of the secondary roads of California have become very important due to the development of minerals necessary to the production of arms and munitions.

One example is a State Route west of Red Bluff, which serves large mineral deposits and a number of sawmills. Four light steel trusses on this route are to be strengthened by the addition of salvaged steel plates to permit full legal loads.

To avoid further the absorption of large quantities of vital steel production, a number of steps have been taken. For instance, plans have been developed and are now in use for mass concrete arch culverts in place of the usual reinforced-concrete design. The State is also using scrap railroad rail of the lighter sections not in demand as rail. These rails are used either full section, split, or rerolled into reinforcing steel. Although the slightly higher cost does not make use of these rails for reinforcing steel attractive in normal times, it is felt the huge saving in steel-mill capacity is worth the additional cost at this time.

The State of California has been making every effort to reduce to an absolute minimum the use of critical materials on highway projects. Until normal conditions again prevail, their engineers, like those of other state and county highway departments, will exercise all their ingenuity and resourcefulness in building and maintaining bridges essential to the national war effort.

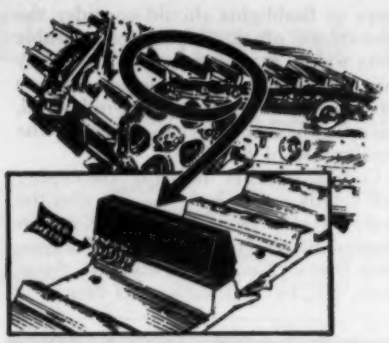
Bulletin on Rechargeable Batteries for Flashlights

A bulletin on Ideal Rechargeable storage flashlight batteries points out that, with the present 50 per cent reduction in dry cells by WPB order, regular users of flashlights should consider the advantages of the Ideal Rechargeable units which, it is stated, outlast 400 dry cells. This type of rechargeable cell was introduced three years ago for industrial, utility and shop service requiring the regular use of flashlights.

Copies of this bulletin containing full details on the batteries and also the chargers may be secured by those interested direct from the Ideal Commutator Dresser Co., 1366 Park Ave., Sycamore, Ill., by mentioning this item.

C.H.&E.
CONSTRUCTION EQUIPMENT
Three Ton Tandem Roller
For patch work. Operates same as automobile, slow forward and reverse speed, controlled by one hand lever. Both front and rear rolls can be filled with water. Easy to load on a truck for transportation from job to job.
Write for Bulletin
3810 N. Palmer St.
C. H. & E. Manufacturing Co.
Milwaukee Wis.

This is the
FIRST STEP IN MAKING SYNTHETIC RUBBER!
A LINK-BELT SPEEDER
HANDLES MATERIALS
THAT WILL BUILD A PLANT
The picture shows a 1½ yard Link-Belt Speeder clam shell feeding a batching plant that supplies 400 yards of ready-mixed concrete each 10-hour day. The concrete is being used in the construction of a giant synthetic rubber plant . . . This is just another example of the vital way in which dependable, trouble-free Link-Belt Speeder Machines are being used to speed up wartime construction work.
9138
BUY WAR AND U.S. BONDS STAMPS
LINK-BELT SPEEDER
BUILDERS OF THE MOST COMPLETE LINE OF
SHOVELS-
CRANES-
DRAGLINES
LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)



A Bulldog Grip-Lug partially welded to a worn tractor grouser to renew traction efficiency.

Device Extends Life Of Tractor Grousers

Worn tractor grousers mean a great loss of traction efficiency, resulting in fewer loads hauled per day and eventually loss of time due to breakdowns and need for repairs. The Bulldog Tractor Grip-Lug, made by Allied Steel Products, Inc., N. B. C. Bldg., Cleveland, Ohio, when applied to worn tractor grousers, is designed not only to reduce expensive replacement costs but also to save time and labor by increasing traction.

The Grip-Lugs are easily welded to worn grousers on any crawler-type tractor. Any high-grade steel electrodes may be used for welding the Grip-Lugs into position. They are grooved and beveled on both sides to facilitate laying a welding bead along the edge, and the welded metal forms and holds like a vise in and around the grooves and bevels. The special shape provides additional strength, it is stated. In finishing the ends of the Grip-Lugs, they should be built up with weld metal.

A folder describing the Bulldog Grip-Lug and illustrating its use on worn tractor grousers may be secured direct from the manufacturer by interested contractors and state and county highway equipment superintendents. Just mention CONTRACTORS AND ENGINEERS MONTHLY.

Maintenance Report On California Roads

In the Thirteenth Biennial Report to the Governor of California by the State Director of Public Works, the wartime problems of highway maintenance are discussed and the changes in handling highway maintenance work which are necessitated by the war are reported on.

It is pointed out that since shortly after war started, there has been a decreasing total volume of traffic but not in the truck classification and that in the first three-month period of the war, extraordinary damage was caused in certain areas by heavy truck hauling, the repair of which is estimated to exceed $1,500,000.

It has been determined that, on the basis of existing surface types comprising the rural state highway system, 10 per cent or an average of some 1,250 miles must be resurfaced or retreated each year in order to conserve properly the investment in highways and to serve traffic. Under present circumstances, with new construction and reconstruction limited to projects essential to the war effort, the program of reconstruction is falling behind at a rapid rate. In view of the normal need, it is most evident that cutting down on construction and reconstruction is certain to create an increasingly serious situation from the highway maintenance point of view. Another serious problem is that of equipment with which to carry on highway maintenance.

The report summarizes the factors affecting maintenance work in California as follows: 1. Accelerated damage to highway surfaces due to the general increase in hauling; 2. Abnormal increase in bus and truck traffic with a general decline in passenger car traffic; 3. Discontinuance of reconstruction of highway surfaces to a considerable degree during the emergency, except where directly related to the war effort; 4. Damage to secondary highways as great as on main strategic routes, due to the fact that lumber mills and mines of critical materials are frequently located on such routes; 5. Difficulty in securing road materials, lumber, replacements for worn-out equipment, repair parts and supplies; and 6. Difficulty in securing capable men as replacements for those who enter the service or war industries.

In addition to these, there is a reduction in amount of funds available for the work, together with an increase in cost, as a result of higher prices for materials, more frequent delays in deliveries, breakdown of equipment and labor turnover. An unlooked-for item of expense was the cost incurred in the wages of guards at bridges, maintenance stations, etc. The expenditure for this work from December 7, 1941, to June 30, 1942, was $146,000.

In the light of these factors, the current maintenance program was reviewed last year and consideration given to reduction in the amount of work or the total elimination of certain features, such as a reduction in traffic striping, highway lighting, weed eradication, spraying and burning roadside vegetation, care of trees and shrubbery, snow removal, sanding icy pavements, and placing nonskid surfacing. In addition, the standards of maintenance are being lowered generally throughout the system, with less attention being given to secondary highways and work concentrated on the major routes in proportion to traffic use.

GRIFFIN

GRIFFIN

WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE RENT

Prompt Shipments

Send for our New 60 page illustrated catalog

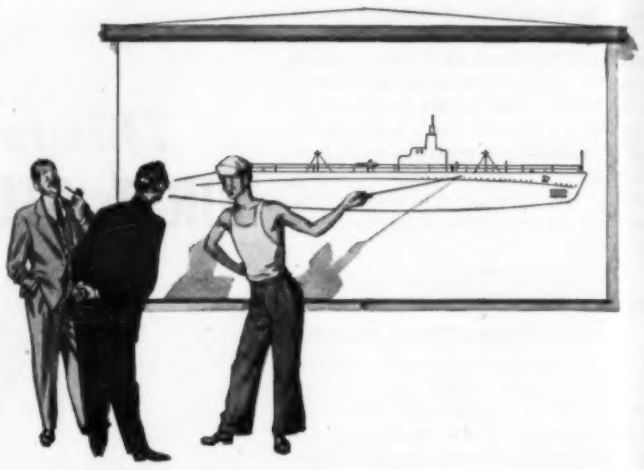
"GRIFFIN POINTED WELLPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and data for jetting.

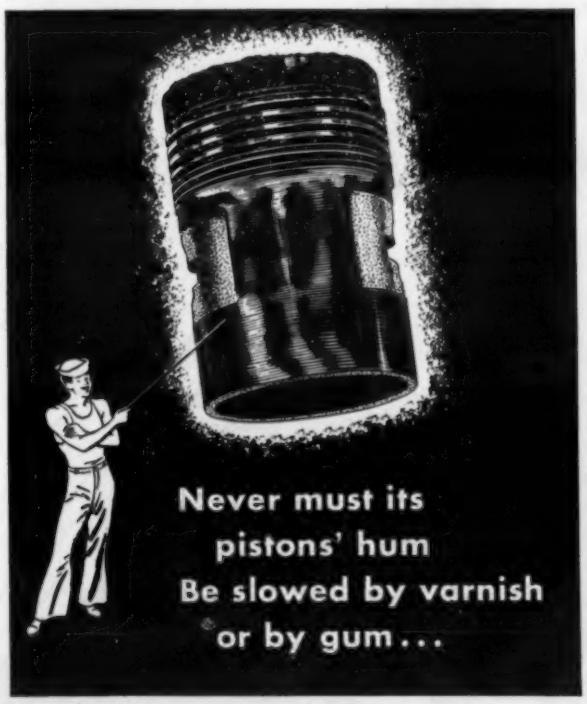
GRIFFIN WELLPOINT CORP.

881 EAST 141st ST. • NEW YORK, N. Y.

Phones: MElrose 5-7704-5-6

This submarine of the U. S. fleet Must keep its Diesels running sweet . . .





. . . use RPM DELO, used by the United States Navy to lubricate the powerful Diesels in our submarines and other warships.

These drawings, from actual photographs in our files, reveal the difference between two pistons, each run 846 hours in a test. One was lubricated with the finest straight mineral oil available, yet its rings were stuck with gum and the skirt was varnished.

The other, lubricated by RPM DELO, was protected by the non-corrosive, anti-oxidant properties that make "RPM" the world's finest Diesel oil. Put RPM DELO to the test in your own Diesels. You, too, will see how it retards ring-sticking and varnishing.

RPM DELO

ORDER RPM DELO FOR YOUR DIESELS

RPM DELO is marketed under the following names:

RPM DELO • Caltex RPM DELO • Kyso RPM DELO

Signal RPM DELO • Imperial-RPM DELO • Sohio RPM DELO CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

STANDARD OIL COMPANY OF CALIFORNIA

War Stimulates Paving Using Asphaltic Types

Airport Paving Races Ahead of Peacetime Schedule. Hot-Mix Use Increases and Emergency Types of Surfaces Developed

By BERNARD E. GRAY, Chief Engineer and General Manager, The Asphalt Institute

THERE have been a number of developments in the use of asphalt brought about by the war, perhaps the most important of which is in connection with airports, as in this field there has been a volume of construction which under peacetime conditions would not have taken place during a 10-year period.

The modern airport is a huge affair, and the paving of runways and other surface areas at a single base may total as much as a million square yards. This is equivalent to over 75 miles of a standard state highway, and it is thus apparent that a saving of even a few cents per square yard quickly runs to large amounts.

The development of sound techniques whereby locally available rock, slag, sand, and gravel can be placed, compacted, and waterproofed to a predetermined condition has made this paving possible at low cost and yet with ability to carry the heaviest present loads. Furthermore, such a procedure lends itself to stage construction so that when heavier planes are built after the war, additional thickening of the surface can be easily accomplished.

Hot-mix asphaltic concrete, of the coarse-graded type, has had tremendous stimulus under wartime conditions for such paving, owing to the fact that it can be placed rapidly at all temperatures. Considerable work has been done even below zero, while paving at 10 degrees F has been frequent. Asphaltic concrete cannot freeze, and the only problem is to provide for placement and consolidation in such a manner as will produce the required density. Mechanical spreading and immediate rolling have met the needs of the situation.

Another interesting development has been the paving of areas subject to steel-tread tank traffic, including test tracks and parking areas. One who has seen a 30-ton tank lock one tread and slue around the corner of a test track at 25 miles an hour will never forget it. Also he will take a look at the track and marvel that it stands up under such abrasion.

In designing mixtures for such severe service, careful preliminary studies are required. It is necessary to have high stability and yet extreme toughness. Coarse-graded mixtures are superior to fine-graded ones because abrasion is at a slower rate. The depth of pavement should range from 6 to 8 inches, as mass is important in resisting the horizontal thrust of the tank treads. The hardness of the asphalt cement should be somewhat greater in the surface than in the base, using 50-60 and 85-100 penetration asphalt respectively.

The development of emergency types of surfacing, especially in combat areas, has demanded considerable study. Under such conditions one has to use what is at hand. For example, it is possible to use Navy Bunker fuel oils (often containing high percentages of asphalt) for various kinds of surface treatment and road-mix work, and it is necessary only to apply fundamental principles of design to obtain very good results, especially where long life is not the important consideration. The versatility of American engineers in this field is being displayed just as it has been shown so well in combat itself.

In conclusion, it may be said that these rapid developments, both in design and use of equipment, should stand us in good stead when peace returns, because then we shall have the task of rebuilding our streets and highways, and it won't be a small job.

Caterpillar Employees Receive Safety Award

The 17,000 employees of the Caterpillar Tractor Co., Peoria, Ill., have just been given the Liberty Bell Safety Award in recognition of their record-breaking plant safety frequency rate of 10.3, set during the year 1942.

Caterpillar employees set a new all-time company safety record during the month of March with a frequency rate of only 4.16 lost-time accident cases per 1,000,000 man-hours of work, the company's Safety Division has just announced.

Portable Pipe Lines

Portable pipe lines which can readily be moved for installation over difficult terrain to carry gasoline supplies to motorized units in the field have been developed by the Army. The new pipe line comes in self-contained half-mile units, each complete with a centrifugal pump driven by a 20-hp gasoline engine, according to *Army Motors*, a publication of the Motor Transport School at the Holabird Quartermaster Depot, Baltimore, Md. Each half-mile unit can be moved by cargo trucks and used independently of any other unit.

These self-contained sections, alone or in combinations, are said to be able to deliver gasoline through swamps and forests or over mountains at the rate of approximately 200 gallons per minute. The pipe also can be used to assist or even replace floating gasoline tanks for ship-to-shore operations.

This is one of the many developments for prosecuting the war which will have new peacetime applications when the war is won.

SLOPE-METERS SPEED VICTORY

Automatic Slope-Meters are in use on the construction of airports, dams, building sites and highways. Slope-Meter is a compact, sturdily constructed instrument that is attached in a spot convenient to the operator and will automatically show the exact grade or slope on which the machine is working.

Order From Your Equipment Distributor Today

THE SLOPE-METER CO.
3632 Bryant Ave., South Minneapolis, Minn.

Cleaver-Brooks Portable Pumping Booster mounted on truck in service of Oklahoma Bituminous Distributing Co., Ada, Oklahoma. This unit is operated in airport and military road construction.

BUILDING the vastly expanded network of auxiliary airports — emergency landing fields and strips — required for our tremendous national aviation training and development program was, and still is, a vitally important —"RUSH"— war assignment.

On scores of such projects Cleaver-Brooks Tank Car Heaters and Bituminous Boosters were on the job — heating the oils and bituminous materials needed.

Construction crews were not delayed, for Cleaver-Brooks equipment circulates and pumps such material after rapid heating to a wide range of application temperatures as required on the job.

Bituminous boosters and tank car heaters were pioneered by Cleaver-Brooks — hundreds of them are in nation-wide use for airport and road construction and maintenance. They are without equal in speed and economy.

Write for complete information.

CLEAVER-BROOKS COMPANY
5110 North 33rd Street Milwaukee, Wisconsin, U. S. A.

Cleaver-Brooks

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

STERLING LIGHT PLANTS

BUILD FOR DEFENSE with STERLING PUMPS HOISTS and LIGHT PLANTS

STERLING MACHINERY CORP.
405 13 Southwest Blvd Kansas City Mo

Snow-Drift Control By Roadside Planting

Reports and Discussions From States in the Snow Belt on the Use of Trees And Shrubs as Snow Fence

(*Photos on page* 68)

✦ A LOOK backward at one phase of roadside development may aid us in making better plans for the planting of our roadsides in the post-war period. A number of states have done a small amount of planting of trees and shrubs for the control of snow drifting on highways, while others have reported extensive projects, some have merely experimented, and others rely on streamlining alone.

Rely on Streamlining

Typical of the northwest is the work in Nevada where little or no planting has been done, but the streamlining of the highway cross section has proved sufficient to prevent the formation of drifts on the traveled way. This can be done effectively in the plains areas while in more rolling country snow fence, or the naturalizing of this unsightly 8-month installation by using well-planned planting, can effectively control drifting. The latter also adds to the appearance of the roadside throughout the year.

W. T. Holcomb, Assistant Highway Engineer, Nevada Department of Highways, reports that landscaping in Nevada has been principally for the purpose of improving riding conditions in regard to shade, scenery, etc., in connection with the elimination of erosion on slopes, and in some instances to replace trees and shrubs which were of necessity removed during highway construction. Streamlining in connection with snow removal has been confined to experimenting with road design or road section with, of course, the installation of snow fences outside the roadside improvement to prevent, as much as possible, the drifting of snow across the highway.

Vermont has never made any real attempt at roadside planting of trees and shrubs to serve as a natural snow fence. Considerable work has been done in the design and construction of new highway projects towards improving snow-drift and snow-removal conditions. A study is made of the snow-drift areas before the project is designed and the results of the study are incorporated in the design. An attempt is made to raise the grade line in fill sections from 18 inches to 3 feet above the adjacent ground, with flat fill slopes usually 1 on 4 or flatter. The highway, when on a relocation, is so placed as to avoid cuts on the drift side of the prevailing wind, and narrow-cut sections are avoided wherever possible.

Shoulders, ditches and backslopes in Vermont are designed wherever possible to provide ample storage space for snow-plow deposits and drifts. A shoulder width of 8 to 10 feet is considered ample. In shallow cuts the backslopes are never steeper than 1 on 2 and are usually flattened to 1 on 4. When borrow is required, an attempt is made to widen the excavation through deep-cut sections in order to create larger storage space for snow deposits, according to A. J. Runnals, Road Engineer.

Little or No Planting

Henry J. Schnitzius, Landscape Supervisor, State Highway Commission of Indiana, reports that the snow-drift problem in Indiana is not as important as it is in some other states and very little has been done through roadside development in this field. The greatest difficulty in Indiana is the cost of removal of sleet and packed wet snow, and there is little in cross-section design or planting that affects this. Indiana is streamlining all cross sections in new construction and in all alterations on old roads but this is generally to help the situation rather than to show exceptional results. When doing landscape planting in Indiana, the areas are studied carefully to avoid planting where drifts might be caused by the planting of groups of trees or shrubs.

Very little planting has been done in Missouri for snow control. One project was completed along U. S. 40 just west of Columbia. Here approximately 900 Hansen bush cherries were planted two years ago on private property on the north side of the highway. The growth of these bushes has been small and, according to F. L. Stuckey, Assistant Engineer of Maintenance, the results obtained have been rather disappointing.

In the design of highways, thought has been given to snow-drift control in Missouri by the construction of wide ditch sections with the roadway slightly raised above the terrain. This kind of section results in less drifting of snow on the roads but not sufficient supporting data are available to furnish definite statements.

In Utah, there has been no planting of trees and shrubs to serve as natural snow fences as it is an arid region and tree planting is generally not successful except in irrigated sections. Most of the trouble with snow is on highways at high

(*Continued on page* 58)

Old friend arrives . . . Thanks to you

When you're halfway around the world, trying to finish an important job, it's mighty pleasant to greet an old and very helpful friend you used to work with.

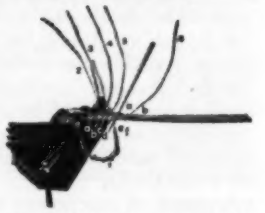
Back home, in scores of industries, the men now on palm-fringed shores learned an affectionate respect for the dependability of Wickwire Rope. Now when stout wire rope is more than ever a matter of life and death, the sight of a reel of *Wickwire* Rope brings double cheers.

These buddies of ours know that *you* need Wickwire Rope, too—to help in your speeded-up *production* of lots of things for them. So they're grateful when you make each length you now have last longer, so that more Wickwire Rope can be used to equip the Liberty Ships, and to send overseas.

But when you do need more of this friendly Wickwire Rope to help maintain your war-production pace, won't you please order it *without* reels, if lengths will permit, so that handier reels can be spared for the boys out there? Wickwire Spencer Steel Company, 500 Fifth Avenue, New York.

• • •

Wickwire Spencer was the first manufacturer in all New England to be awarded the Maritime M and Victory Fleet Flag for outstanding production accomplishments!



DO YOUR MEN KNOW HOW?

Our free book "Know Your Ropes" pictures the best ways to splice, attach sockets, etc. Also shows the right and wrong ways to use wire rope. In the hands of new men (and even old-timers) it can help you make your present wire rope last longer. Send for a free copy.

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER

WICKWIRE SPENCER STEEL COMPANY

WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCT

CMC

CHECK WITH YOUR CMC DISTRIBUTOR ON

MIXERS
BATCHERS
PUMPS
SAW RIGS
HOISTS
CARTS
BARROWS

—rebuilding . . . repairing . . . reselling your equipment.
—new CMC equipment that may be available.
—repair parts and service.
—rentals.

GET FREE CATALOG

HE'LL HELP YOU!

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

Flight Strip Program Is Internationalized

(*Continued from page 2*)

in American republics all work is initiated and carried out by the national governments. This is due in measure to the importance of these government-owned auxiliary landing areas to the national security. Carrying out this policy, the custodians appointed to take care of the Flight Strips will be civilians, as in the United States where the state highway departments employ the custodians for the non-military non-technical work. In cases where the Flight Strip is occupied by a military unit, it becomes a military post with the custodian chosen from Army personnel.

The Standard Plan

As in the United States, the Flight Strip will be standardized as shown in the diagram on page 2. All shrubs and trees are cleared from the entire area and at the ends of the runway to insure a 40-foot horizontal to 1-foot vertical unobstructed flight path from a 1,000-foot stabilized extension at each end of the paved runway. The length of the paved runway is standardized at 4,000, 5,000, 6,000 and 8,000 feet for construction at sea level, the varying lengths depending on the character of the aircraft which will use the Flight Strip. The standard paved runways, 150 feet wide, are lengthened when built above sea level: at 4,000-foot elevation a standard 6,000-foot runway would be built 8,000 feet long with the same 1,000-foot stabilized extensions at each end.

In Latin America, as in this country, no buildings will be built on the Flight Strip area, but may be adjacent, just as garages, restaurants, etc., are erected adjacent to highways.

The interest of the republics to the south in our Flight Strip program and its extension throughout the length of the Pan-American Highway is further evidence of hemisphere solidarity and the continued growth of Good Neighbor relations north and south of the equator. We may well look forward to an unbroken chain of Flight Strips from the Aleutians to Cape Horn to provide protection in peace and war to commercial and military aviation.

Those Damned Pliers

By A. E. LEWIS

Two young men employed on construction work in Southern California recently learned a safety lesson they never will forget: one, because of an eye, which for several days he thought he had lost; the other, because he found out why he was the chief cause of the miraculously unfatal accident.

They were tying reinforcing steel in place with heavy baling wire. One was holding the steel, and the other pulling the wire tight with a pair of pliers. According to the injured man, the pliers slipped and struck his eye; the other employee gave the identical explanation with the addition, "The pliers were defective", apparently under the impression that, with this explanation, he cleared himself.

An examination of the pliers, and a talk with its user, showed that the tool was in fact defective, worn, and with jaws so loose that he had difficulty in grasping the wire, let alone pulling it. Also, the pliers were entirely too small for the job. But he (ordinarily a more than usually intelligent and willing worker) had gone on groping with the pliers—slipping, seeking another grip, slipping again. It was only when the pliers slipped into his co-worker's eye that he realized that they were inadequate. Shamefacedly he confessed that new and heavier pliers were in a tool box less than 50 feet from him and that he merely had to turn in the old tool to receive what he needed.

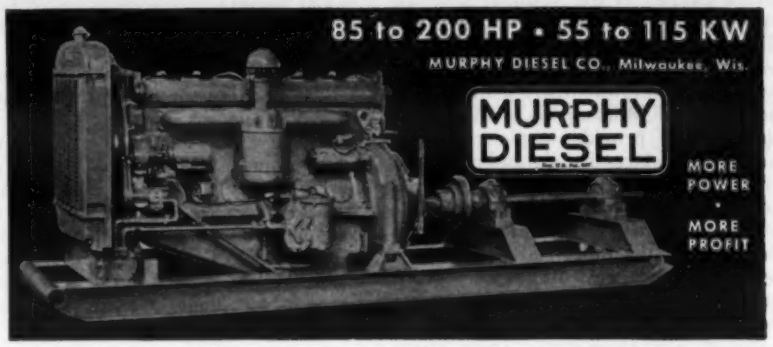
He is a smarter boy now. He learned the old lesson: that when a tool starts definitely to balk at a task, it pays to stop and obtain the correct tool for the job.

New Bucyrus-Erie Officers

In a series of changes in officers designed to give increasing responsibility to younger men, the Bucyrus-Erie Co., South Milwaukee, Wis., recently elected N. R. Knox, Vice President in Charge of Manufacturing since 1933, to the position of President of the company. W. W. Coleman, President for 32 years, was re-elected Chairman of the Board; George A. Morrison, former Vice President, was elected Vice Chairman of the Board; and W. L. Litle was elected Vice President and will be in charge of the company's plants at Erie, Pa., and Evansville, Ind. Appointed officers now include: W. M. Bager, Technical Director; D. P. Eells, Vice President with special assignments; P. H. Birckhead, Vice President in Charge of the Sales Department; R. W. Newberry, Vice President in Charge of the Commercial Department; and C. K. Charlton, Assistant to the President. The senior officers will continue to devote full time to the company's affairs, but the changes will give greater responsibility to younger members of the organization.

The Bucyrus-Erie Co., manufacturer of excavating, drilling and materials-handling equipment, operates plants at South Milwaukee, Wis.; Erie, Pa.; Evansville, Ind.; and Chicago, Ill.

Never has the proper care of equipment been so important. The machines you now have must last for the duration, so take care of them.



● Rear-Dump and Bottom-Dump EUCLIDS may not capture any enemy positions or win any battles, but the jobs they are doing here and overseas help provide our armed forces with the raw materials for victory.

It's on victory's starting line — the open pit mines, quarries, power dams, army and navy bases, airports, cantonments, armament plants, ordnance depots, etc. — that Euclid speed, capacity and dependable performance have been called upon to complete tough jobs in record time and at lower cost per ton or cubic yard. Present deliveries are confined to high priority orders, but we're ready to help with your plans for after victory requirements.

The EUCLID ROAD MACHINERY Co., Cleveland, O.

EUCLID
SELF-POWERED HAULING EQUIPMENT
For EARTH . . ROCK . . COAL . . ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS
EUCLID THE PIONEER

Aviation Plans Made For Post-War Program

(*Continued from page* 21)

man Airports, operating the former as a passenger airport and the latter for air freight.

A plan proposed by the Greater Twin Cities Chapter of the National Aeronautics Association would include three additional major airports besides the two mentioned, one east of St. Paul, another north of the midway district, and a third northwest of Minneapolis. These locations would provide ample room for maneuvering large freight and passenger craft without interfering with traffic at adjoining ports. In addition to these major terminals, two landing strips in the heart of the industrial areas of the two cities are suggested to make possible rapid and efficient freight and express transfer from railroad and truck-loading docks to aircraft docks. These strips would run parallel to existing railroad lines with city streets passing underneath. This suggestion is unique in planning landing facilities within a built-up area.

From 20 to 40 smaller landing areas, which might well be Flight Strips, are planned for light commercial and private planes and would be located on the outer edge of the heavy aircraft area. These would be connected to both cities and each other by highways, as shown in the accompanying sketch. This system of major air terminals, industrial-area landing strips, and smaller landing fields would connect with local airports and landing fields throughout Minnesota to form complete air transportation coverage of the entire state and northwest.

New York City, which has gloried in its LaGuardia Airport, is now already starting another airport which will dwarf LaGuardia. The present major airport is 550 acres in extent, while the new airport comprises 2,576 acres now being filled by dredging.

Detroit, Mich., is planning, as part of its post-war construction program, to expend $15,000,00 in improving its present municipal airport, $8,000,000 on a new city airport to the southwest, $7,000,000 on another airport to the northeast of the city, and $3,000,000 for a seaplane base.

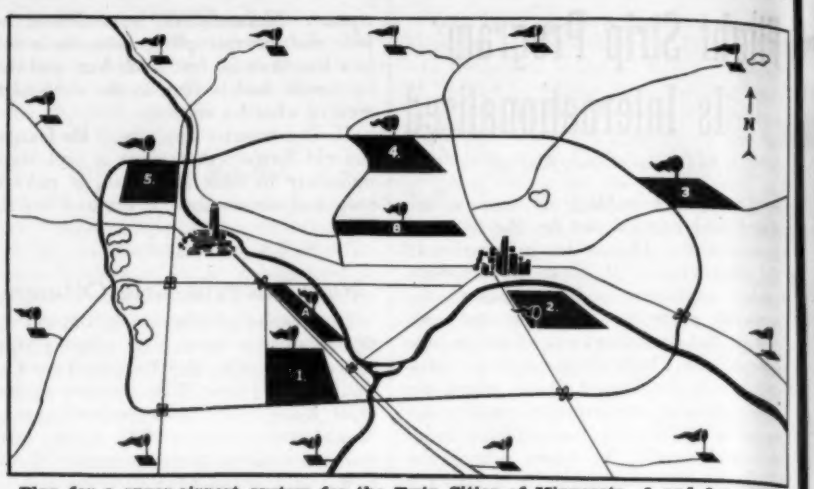
The Municipal Airport Commission of St. Louis, Mo., is planning the expenditure of $10,565,000 on a new municipal airport which will include runways, lighting, drainage and sewers, aprons, hangars, administration and shop buildings, located in St. Louis County, adjacent to the confluence of the Missouri and Mississippi Rivers. Surveys are already underway.

San Francisco is planning five airport projects for the extension of runways and other improvements to the existing airport, totaling about $2,175,000.

These examples show the foresightedness of American municipalities in taking advantage of the inevitable increase in air traffic after the war by starting plans now to design these facilities and provide proper terminal areas near their cities. In addition, they realize that such construction will provide local employment through needed public works which can be built by contract during the industrial conversion period, thus benefiting business, government and industry.

Conclusion

These are but the starting point for the development of air terminals, airfields, landing strips, glider depots, and allied construction resulting from the post-war needs of domestic aviation. Initial surveys and acquisition of lands adjacent to existing airports, or at new locations, should start now, so that detailed plans may be completed and ready for the award of contracts promptly after the end of the war. Air transports won't wait until a local community decides five years from now whether or not it will have a modern airport for either shuttle, intrastate or transcontinental service. State aviation commissions can do much to aid counties and cities to fit themselves into the picture in the proper perspective and definite planning should start *now*.

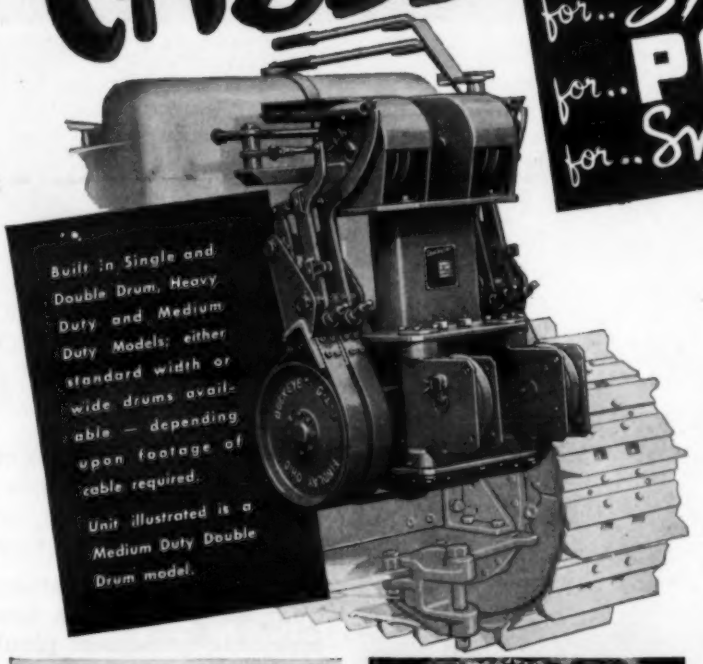


Plan for a super-airport system for the Twin Cities of Minnesota. 1 and 2 are the existing Wold-Chamberlain Field and Holman Airport in Minneapolis and St. Paul, respectively, 3, 4 and 5 mark the sites of proposed additional major airports, and A and B, landing strips parallel to existing railroad lines.

To carry out this vast airport expansion program, contractors must also be ready with plans for undertaking the necessary construction. The unprecedented size and speed of our Army and

(*Concluded on next page*)

Buckeye CABLE control .... for.. SPEED for.. POWER for.. Smooth Action


Built in Single and Double Drum, Heavy Duty and Medium Duty Models; either standard width or wide drums available — depending upon footage of cable required.
Unit illustrated is a Medium Duty Double Drum model.

FOR operating any cable controlled tractor equipment and for 101 miscellaneous cable jobs as well, Buckeye Power Control Units offer you these big advantages·

FAST ACTION—*a touch of the controls and the cable sings into action at a line speed of 300 ft. per min. or more.*

PLENTY OF PULL—*a line pull of 8500 lbs. is a cinch for a Buckeye winch.*

NO JERK ON THE LINE—*here's a cable-saving, equipment-saving feature doubly important in wartime. Buckeye Hoists take hold smoothly with a cushioned action.*

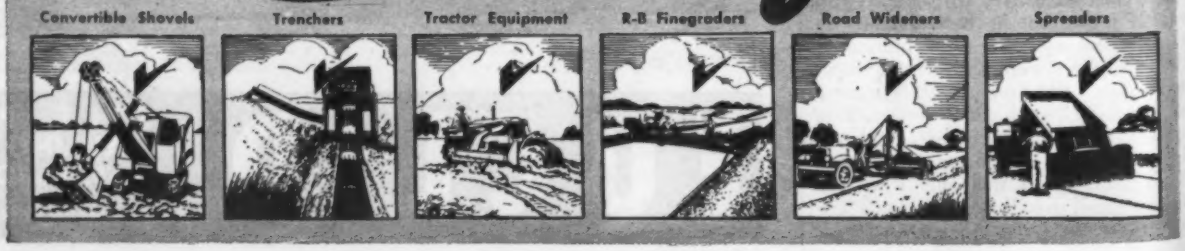
Buckeye Power Control Units are built for hard usage. Big, cool-running brakes and clutches, cable-saving fair-lead action, high leverage controls within easy reach, gears running in oil, rugged construction—all factors that make Buckeye Winches your logical choice for any make or model of tractor. Write today.

Backfilling a trench in frozen soil with Buckeye Dozer and Winch.

Buckeye Power Control Units for Bulldozers and Scrapers in Panama.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio

Built by Buckeye



NEED A BIG Trailer?

La Crosse Makes Them Up To 200 Ton Capacity

•• WRITE OR WIRE ••

LA CROSSE TRAILER & EQUIPT. CO.
LA CROSSE, WISCONSIN U. S. A.

Prepare Now for Work On Post-War Airports

(Continued from preceding page)

Navy air-base program, resulting from the urgent needs for war, have brought forth many new developments and adaptations in both new methods and equipment for airport construction with which contractors must be conversant before they can successfully take on jobs in the post-war period. When this post-war work actually starts, competition will be keen, and the successful bidder on any specific job will be the one who has prepared himself by a careful study of the newest methods and equipment which will insure a speedy, competent and profitable completion of the contract.

Every issue of CONTRACTORS AND ENGINEERS MONTHLY for the past year has carried articles describing the methods and equipment used by contractors to speed up the paving and other construction activities at airports throughout the country, and future issues will contain similar articles to keep our readers up-to-date on the latest developments and time-saving devices. We suggest that our contractor readers maintain an information file of articles describing work of the type in which they are interested, and also of all announcements of new equipment for use in that type of construction. By providing data in convenient reference form, such a file can be of inestimable help when bids are called for. (C.&E.M., April, 1943, page 15).

On page 29 of this issue, Bernard Gray, Chief Engineer and General Manager of The Asphalt Institute, discusses some of the developments in asphalt-paving mixtures and methods which have resulted from war construction and which will be applied to our peacetime airport work. A number of pamphlets giving complete details and specifications on the most modern asphalt pavements for runways and parking aprons are available gratis from the Institute.

In the use of portland cement, one of the most interesting developments has been soil-cement stabilization for runway bases and, in some instances, the use of soil-cement as a pavement for parking aprons. Information on soil-cement stabilization for airports, as well as the latest developments in concrete-paving specifications, may be secured at any time from the Portland Cement Association.

Planning for post-war construction should be a cooperative inter-related activity. Unless every group or agency involved is making its preparations simultaneously, the best-laid plans of one group may bog down due to the lack of preparedness by another. It is up to contractors to plan for the future and prepare themselves and their organizations for the competition and opportunities of the post-war world.

Rust-Prevention Paint Uses Old Indian Pigment

A nature-compounded mineral, consisting mainly of amorphous silica and complex iron oxides, which had been used by the American Indians for many years to secure pigment for their works of art, is used today as the pigment for a rust preventive paint known as S.R.P. This paint, it is stated, provides a protective film for exposed surfaces and defies weather extremes, light, heat, alkalies, and sea water, as well as inhibiting electrolysis and corrosion.

Detailed information on S.R.P. rust-prevention paint and its uses in protecting exposed metal surfaces may be secured by those interested direct from L. Sonneborn Sons, Inc., 88 Lexington Ave., New York City. Just mention this item.

Toro Personnel Changes

Announcement has been made by the Toro Mfg. Corp., Minneapolis, Minn., manufacturer of mowing machinery, of the following changes in the officers of the company. J. S. Clapper, President since 1914, has retired from that position and has been elected Chairman of the Board of Directors; H. C. McCartney, Secretary-Treasurer since 1914, has been elected President and will continue his duties as Treasurer; Kenneth E. Goit, Sales and Advertising Manager since 1925, has been elected Secretary in addition to his present duties; and C. E. Ostberg, Assistant Treasurer, has been elected Assistant Secretary.

There'll be Another WAR WINTER

Will Your

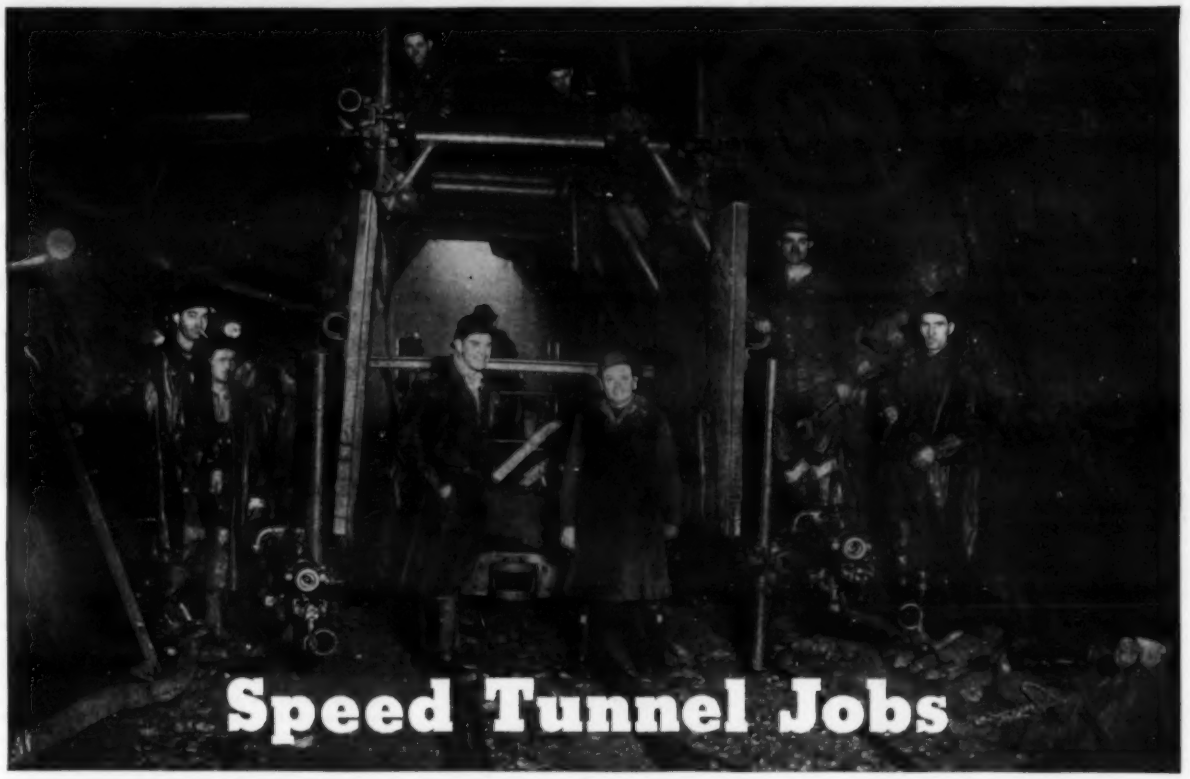
DAVENPORT-FRINK SNO-PLOWS

be Ready?

May we again suggest that you check over your snow removal equipment, order your repair parts EARLY and be PREPARED to keep essential traffic moving when the snows come? The sooner you order, the more surely and quickly you'll get the necessary parts to enable you to say "O.K., We're Ready".

DAVENPORT BESLER CORPORATION Dept. A DAVENPORT, IOWA

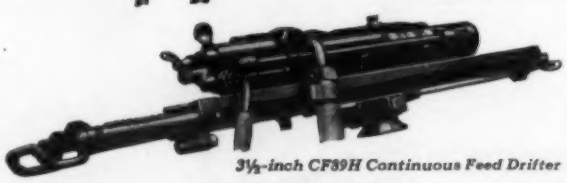
Made in Eastern U. S. A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK



Speed Tunnel Jobs

With Gardner-Denver Continuous Feed Tunnel Drills

3-inch CF79 Continuous Feed Drifter



3½-inch CF89H Continuous Feed Drifter

4-inch AF99 Continuous Feed Drifter

WHEN emergency tunnels must be driven quickly for military transportation—roads or railroads, or for aqueducts—these Continuous Feed Drifters by Gardner-Denver prove their ability to speed the work. Here are some of the reasons why:

1. No stretching between the drill throttle and the feed control—because all controls are grouped together on the drill back-head.
2. No "nursing" of the feed to keep it from "crowding"—once the feed control is set, the drill does the rest.
3. Requires no "third" hose to supply the feed—no separate oil supply—since the feed motor draws its air from the main air inlet.
4. Far less wear—because of minimum vibration and "slow-motion" feed motor.

For complete information on the Gardner-Denver Continuous Feed Drifters, write for Bulletin CF-2. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER Since 1859

Model NH5W with 4-30,000 C.P. floodlights.

The NITE-HAWK Gives You:

LIGHT—Where you want it—when you want it.

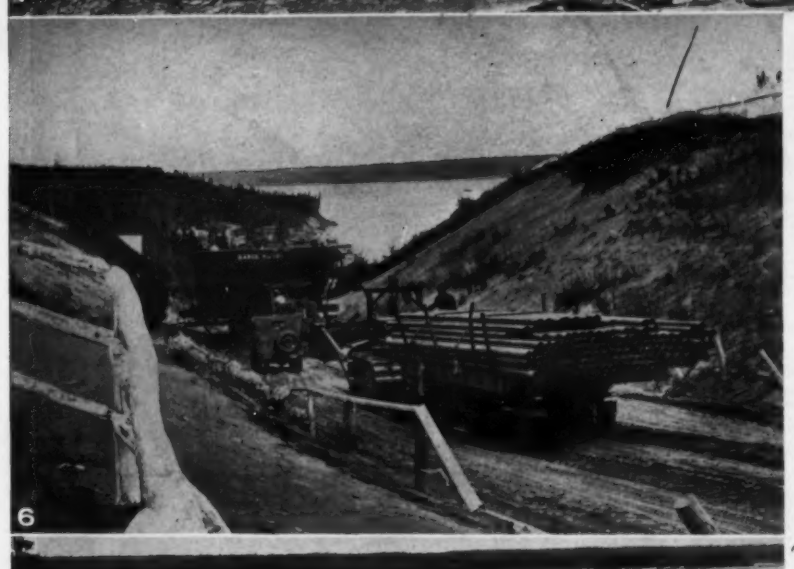
POWER—To operate hand tools—saws, drills, hammers, etc.

Floodlight and Searchlight Units up to 14 million candlepower.

Write for Bulletin 161

LISTER-BLACKSTONE, Inc.

1706 So. 68th Street MILWAUKEE, WIS.



Nothing Can Stump The Army

Here's How It Was Done

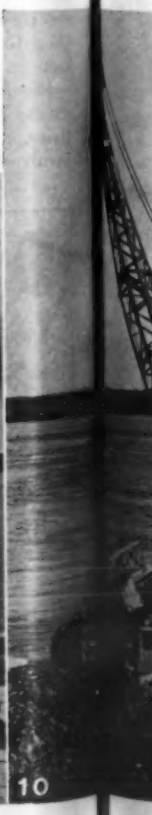
Last summer the U.S. Army Engineers undertook the construction of a pipe line from the Fort Norman oil fields in Canada's Northwest Territory to Whitehorse, to facilitate supplying gasoline, oil, and other fuels to the defense stations on the continent. The first phase of the work was to move miles of pipe, tractors, trucks, and other equipment into the area. This was hauled by rail to Fort McMurray, Alberta, and thence by barge to Fitzgerald on the Slave River. Due to miles of dangerous rapids on a bend of the river, it was necessary to build a 16-mile portage road from Fitzgerald to Fort Smith. These photos show how the equipment was transported around the rapids.

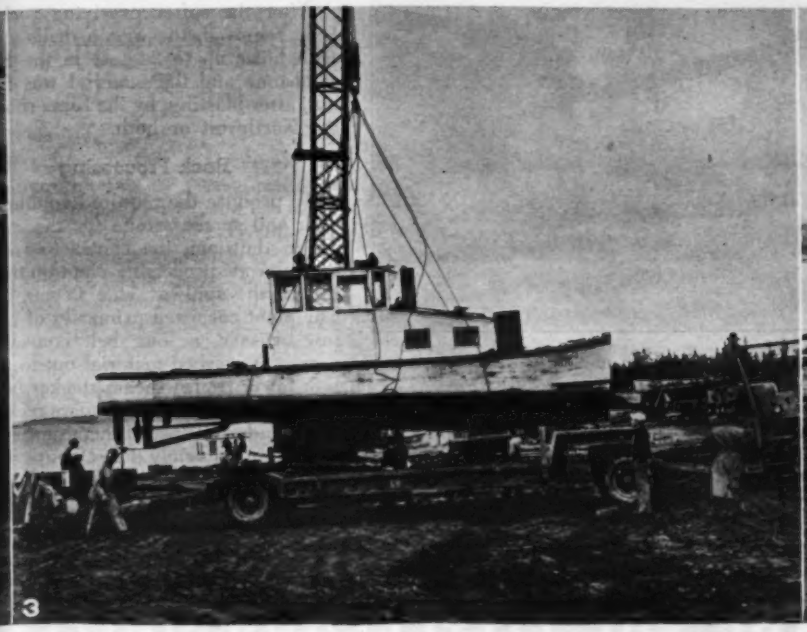
1. At this tiny settlement of Fitzgerald, Alberta, all materials, equipment and supplies were unloaded from the barges for their 16-mile overland trip.

2. The tempestuous Pelican Rapids on a bend of the Slave River which compelled the Army Engineers to build a portage road through the wilderness.

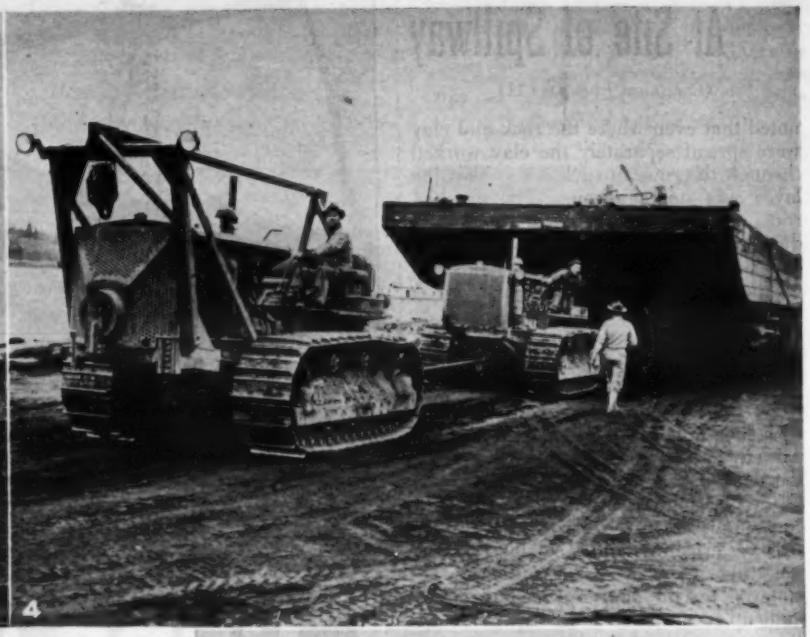
3. At Fitzgerald, an Engineers' boat is picked up by a powerful derrick and placed on a trailer to be hauled over the portage road.

4. Caterpillar diesel tractors in tandem get under way to move one of the 65-ton barges over the 16-mile highway around the Pelican Rapids.





3



4

Engineers

To Construct Pipe Line from Oil Fields In Canadian Northwest to Whitehorse on Alcan Highway, Overland Portage of Equipment Around Rapids Was Necessary;

5

barges, boats, pipe, and other equipment nears -mile trek through the wilderness.

ith in sight, part of the convoy rolls downhill e where the barge will resume its more nor- el on the river.

miles of pipe over this wilderness terrain t the job was done. Here it was reloaded on st of the journey to the oil fields over 800

rges on greased ramps, ready to be refloated. is some of the tons of pipe required for this

9. One of the 65-ton barges, at the end of its 16-mile overland ride, is refloated with a tremendous splash.

10. A huge Northwest dragline and four Caterpillar diesel tractors are loaded on a barge at Fort Smith for shipment up the river to the Fort Norman oil fields.

11. Food as well as equipment had to pass over this same route. Before the heavily laden barge leaves, supplies of food-stuffs are used to put the barge on an even keel.

12. Col. Theodore Wyman, in charge of the pipe-line project, arrives at Fort Smith to inspect progress on the difficult task. With him is Lieut.-Col. T. A. Adcock, at left, as they check maps illustrating the route ahead.

11

12

Fast Rock Excavation At Site of Spillway

(*Continued from page* 11)

noted that even where the rock and clay were spread separately the clay worked through the rock in such a way that the layer was homogeneous. The crushed rock for the filters, which had to be durable and retain its pervious character, consisted of the harder sandstone crushed and used in all sizes from 4 inches down to sand.

Spillway Excavation

The spillway excavation was used entirely for random fill and rock sections, with such non-durable rock as would not pass the grizzly wasted downstream of the dam. This did not occur very often as the blasting was regulated to supply a continuous stream of rock of proper sizes for crushing, and every load wasted was that much loss in production of material for the dam and loss of height built up to meet the 1942 requirements. The material in the spillway excavation ran from indurated clay through shale and overburden with the harder sandstone beneath the clay. The material was loosened by a heavy ripper where possible but as the shale approached the sandstone layer it was too hard for ripping and wagon drills were used with 6 to 12-foot holes. Ingersoll-Rand, Cleveland, and Sullivan wagon drills, supplied with air from the machine shop across the valley through intermediate air receivers to maintain volume close to the drills, were used. The air line was a 6-inch steel pipe. Timken bits were used for the drilling and because of the character of the material gave unusually long service without resharpening. In the soft material as much as 1,000 feet of holes were drilled with one bit but when the hard sandstone was being drilled with holes up to 24 feet the production dropped off to only 2½ feet per bit before sharpening was necessary.

The spillway excavation, much of which was sidehill work, required a maximum cut of 300 feet. The holes were loaded with Hercules or Atlas powders of 30, 40 and 60 per cent strengths and fired by a hand blasting machine or from the high line close by.

In order to secure maximum production and insure the rapid delivery of the broken shale and indurated clay to the crusher, the contractors maintained a pair of well-bladed service roads from the grizzly up to the shovels. The roads were posted "Loaded trucks inside" to minimize the danger of serious accidents. Under normal operation, a 2½-yard Northwest shovel with Amsco bucket loaded the hard rock in the spillway excavation for the rock fill, a 1½-yard Lorain worked in the impervious borrow in the flat valley, while a Lorain 2-yard and a Lima 3½-yard shovel loaded the softer rock. These assignments were changed as required by breakdowns and overhauls and other conditions. A fleet of ten 10-yard Euclids hauled the soft rock from the spillway excavation to the crushing-plant grizzly. The winding hauling road was bladed continuously by a Caterpillar diesel power grader to minimize wear and tear on the truck tires and transmissions.

U. S. E. D. Photo
The rock and earth processing plant, showing the sidehill dumping trestle, crusher house, conveyor belt, and the swinging stacker belt at Youghiogheny Dam.

After the softer overlying rock had been removed, the wagon drills worked with holes up to 24 feet in the harder sandstone and the material was loaded out, after blasting, by the Lima shovel or the Northwest or both.

Rock Processing

To produce the required volume of 6-inch and smaller stone for the random fill in the dam, the contractors set up an elaborate processing plant on the side hill at the spillway side of the valley. The plant consisted primarily of a large jaw crusher, a long belt conveyor to carry the crushed material out to a 100-foot tower from which a stacker belt fed it to stockpiles where scrapers picked up their loads and spread them on the dam.

At approximately 8 feet above the top of the dam excavation, the contractors built a semi-circular trestle, using timber, and in the platform thus formed set

(*Continued on next page*)

PILE HAMMERS
and
EXTRACTORS

HOISTS—DERRICKS
WHIRLERS

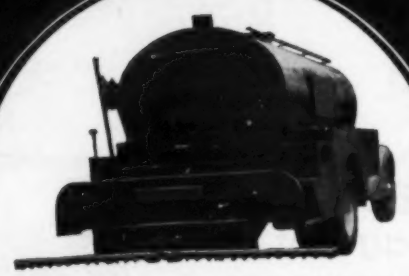
Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

HERE ARE THE LITTLEFORD UNITS HELPING TO PAVE THE ROAD TO VICTORY



"Spray Master" Pressure Distributors are speeding up the construction of Airport Runways, Cantonment Roads, Highways, Parking Areas, etc. Littleford Distributors are the fastest heating and simplest operating Tar and Asphalt Spraying Units yet designed. To get things done, watch the "Spray Master" pave the way to Victory.

Again Littleford gives speed to the War Effort with the "Tankar" Heater. This unit produces steam faster than any similar unit. Heats tank cars for unloading asphalt and tar in 1/3 less time. The Littleford "Tankar" Heater is used to steam clean motors, engines, etc. It's another unit designed to speed up Victory.

Before applying tar, asphalt, road oils, etc., to airport runways, roads, highways, the Littleford Road Broom sweeps them clean; no dust or dirt can hinder the application of materials when a Littleford Road Broom goes into action.

BUY MORE
BONDS and STAMPS

BLACK TOP ROAD MAINTENANCE EQUIPMENT
LB
SINCE · 1900
LITTLEFORD
Littleford Bros., Inc.
485 E. Pearl St.,
Cincinnati, Ohio

Material Processing For Youghiogheny Dam

(*Continued from preceding page*)

a pair of structural-steel grizzlies. The larger one was made for dumping two end-dump Euclids at a time while the smaller was designed for the use of bottom-dump Euclids. The heavy stone with its mixture of overburden dropped into the feeding hopper lined with heavy sheet steel and thence through a unique control device to the large vibrating screen.

The control device originally consisted of a pair of weighted swinging gates and the pressure of the material above. This did not provide sufficient control as the material rushed too rapidly onto the screen. An added control that proved remarkably successful was installed. This consisted of a heavily built gate the full width of the opening and about 18 inches high hinged at the bottom so as to block the flow of the broken stone from the bottom. The gate was operated by a long-arm lever and cable controlled by an Ingersoll-Rand air hoist at the operator's platform. By raising the gate the flow of material was choked off completely. A constant flow of material was assured by the installation of a special heavy-duty Jeffrey vibrating feeder in the bottom of the hopper.

Passing the control gates, the material dropped onto a 6 x 12-foot vibrating screen with 6-inch square openings. Material passing the screen went directly to the 275-foot x 42-inch conveyor belt carrying the material out to the stacker on a 7-degree 40-minute grade. Oversize from the screen went directly into a 48 x 60-inch Traylor jaw crusher set for the production of maximum 6-inch stone at the rate of 400 tons per hour. The large slabs of stone frequently blocked the top of the crusher and had to be snaked around by a large reinforced hook operated by a 4-ton Yale electric hoist. Two men were required to control the operation of the crusher plant at the top, one for the vibrator for the feed, the operation of the hoist and the emergency controls, while the other did the "fishing" with the hook. The huge crusher was driven by a 200-hp Fairbanks Morse electric motor.

Two men below with respirators watched the loading of the big Barber-Greene conveyor belt which carried the material out 275 feet to the control house where the stacker belt took off. This was a 65-foot x 42-inch belt which could be swung 180 degrees in a horizontal plane from the top of the 100-foot tower supporting the outer end of the delivery belt. It was maintained at a 15-degree angle and carried a 2-inch water line to permit the mixing of the required amount of water with the processed stone and overburden as it streamed off the end of the belt. At first this was done by a single nozzle but the wetting was not sufficiently uniform so a hoop of perforated pipe was substituted so that the material would be wet from all sides as it dropped from the belt. The material was stockpiled on one side of the tower and then the arm swung to the other side so that the scrapers could pick up their loads. To prevent segregation of the materials by the larger pieces of crushed stone rolling off the piles to the periphery, a bulldozer worked from the end during stockpiling, moving the fines from the top over onto the coarser material at the sides and bottom.

To maintain adequate control and safe operation of the crushing-stockpiling operation, a system of control lights was installed. The crusher operator had a double bank of red, green and yellow lights at his side. One bank was operated from the loading grizzly and the other from the stacker tower. Similar single groups were located at the grizzly and the tower operated from the control at the crusher. Red, of course, was the emergency indicator meaning "Stop"; Green indicated "Go ahead" on the production by either starting the crusher or the belt as indicated.

The processing plant is reported to have cost $100,000 to set up and place in operation. In order to get the size of crusher needed for production, it was transported from the west coast to this eastern project. The balance of the equipment for the job cost about $650,000.

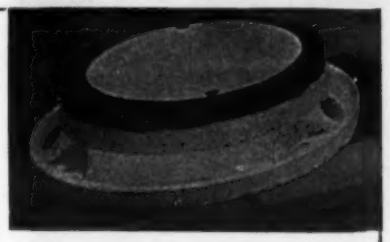
Hauling and Spreading Fill

The impervious fill for the core section as well as the random fill in the form of clay to mix with the rock came from a large borrow area in the valley immediately upstream of the dam site. Here a fleet of two 23-yard and three 14-yard LeTourneau Carryalls making three trips per hour, or at times only 2½ trips,

(*Concluded on page 56*)

The War Production Board Says . . .

"NO MORE MANHOLE COVERS of Cast Iron"



But six months before this order was issued the Cast Stone Institute and United Concrete Form Products had developed a reinforced concrete manhole frame and cover which were in commercial production throughout the country.

Only this concrete manhole cover offers these advantages:

- **Light in weight (cover weighs only 90 lbs.)**
- **Carries H-20 Highway loading (16,000 lbs. plus 25% for impact).**
- **Exposed edges "Armored" to prevent chipping due to either rough handling or wear.**
- **Saves vital steel for its important war job: meets requirements of the WPB.**

Write for the address of the distributor in your locality . . .

UNITED CONCRETE FORM PRODUCTS CO.
5243 W. 25th Place, Chicago, Ill. — 101 Park Ave., New York City

Cletracs . . . . MOVE TONS OF EARTH FOR AN ALL-OCEAN NAVY

Even a deepwater Navy must have land bases for repairs and construction, storing supplies, and training of personnel.

The ability of Cletracs to stand rough treatment when the going gets tough, their rugged power and ease of control—due to controlled differential steering—are being used to speed naval construction. The building of roads, air fields, and training stations, as well as the handling of materials and munitions, is expedited daily by the efficiency and economy of the controlled power of Cletrac tractors.

Now that equipment is difficult to replace—owners appreciate that Cletrac dependability and enduring quality must be protected and prolonged by regular and proper service even more than in peacetime.

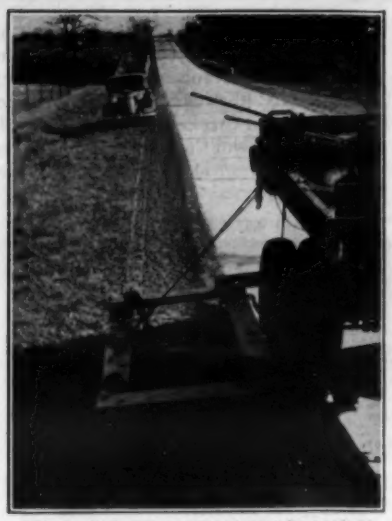
Your Cletrac dealer is prepared to help you get the best out of all your equipment. His service facilities and trained, experienced mechanics will help you make the most of your Cletrac power—to speed construction for Victory.

NO PRIORITIES ON **WAR BONDS**
Next to the Stars and Stripes, Cletrac is proud to be flying the Minute Man flag. Over 95 per cent of Cletrac employees are purchasing War Bonds by pay roll deduction.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

Cletrac Crawler Tractors
GASOLINE AND DIESEL

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS



Where it becomes necessary to protect the edge of a narrow pavement by the use of gravel and crushed stone, this operation can be done neatly, symmetrically, and economically. The berm drag shown above is used in Division 10 in Ohio.

Post-War Equipment For Machine Shops

There is a great deal of obsolete equipment in many highway machine shops which will be replaced in the post-war period by new efficient equipment enabling the highway department to maintain its rolling stock in the very best of condition at the lowest possible cost. Among the new equipment which will be available for this service are the presses and forging hammers of Chambersburg Engineering Co., Chambersburg, Pa.

In Bulletin 206-C, Chambersburg vertical hydro-pneumatic presses for forcing, bending and pressing are described in considerable detail, with a table of specifications and illustrations. Another illustrated folder describes a new modern self-contained forging hammer for maintenance work, enabling a shop to produce much of its own forgings with great economy. The hammer carries its own source of power, a motor-driven compressor, so that there is no load on shop steam lines, air lines or belting.

Either or both of these pieces of literature may be secured by shop superintendents or highway officials interested in planning for improvements in their equipment-maintenance shops. Write direct to the company and mention this item.

To Save Time, Labor Use Large Electrode

A very interesting demonstration of the saving that can be effected by changing to large-size electrodes for production welding is reported by the Baker Mfg. Co., Springfield, Ill., in its studies of fabrication practice of bulldozer frames. By increasing the electrode size from 3/16-inch to ¼-inch, Baker reduced the welding time from 9½ hours down to 7 hours, a saving of 2½ hours per unit, or 26 per cent. Thus, one welder alone can increase the welding output by approximately two complete bulldozer assemblies per week.

The change to larger-size electrodes also effected a saving in labor costs of $1.64 per unit, or over 22 per cent, due to boosting the deposit from 1.32 pounds per hour with 3/16-inch electrode to 2.5 pounds per hour with ¼-inch electrode.

Contractors and others engaged in welding operations may secure from Lincoln Electric Co., Box 5758, Cleveland, Ohio, a pair of tables showing in detail the effect of changing electrode size on the economics of welding, including the rate of electrode consumption and deposition, as well as on welding costs, including labor, overhead, power and electrode cost. Copies will be furnished to those referring to CONTRACTORS AND ENGINEERS MONTHLY.

Enormous Demands for Gasoline and Oil for War

Some revealable facts which show the great difference between this war and the last and which make it clear why we must get along without some things and make those we have go as far as possible are set forth by the Office of War Information.

This war's demands show, for example, that a mechanized division burns up 18,000 gallons of gasoline an hour proceeding along a road at normal speed; a heavy bomber at cruising speed uses 200 gallons of gasoline, and a fighter plane 100 gallons an hour; monthly supplies for each one of our fighting men on a world battlefront use 1½ tons of shipping space, while the ships that carry these supplies, say to North Africa, average 214,000 gallons of heavy fuel oil for the round trip to Casablanca.

Reflecting sharp emphasis on the increased mechanization of war, the quantity of petroleum and petroleum products shipped overseas in the first 12 months of this war was more than 80 times that shipped across in the first 12 months of the last war.

For this reason, it is essential that we use our supplies of gasoline, fuel oil and lubricants here at home wisely and economically.

Contractors Awarded "E"

Blythe Brothers Co., Goode Construction Co., and Harrison-Wright Co., contractors of Charlotte, N.C., have been awarded the Army-Navy "E" for excellence of work in the construction of Camp Lajeune, a large marine base in Onslow County, N.C.

USE TARPAULINS

Order Now!

QUICK SERVICE
NO PRIORITIES NEEDED

Speed construction. Protect vital materials in all sorts of weather. FULTON TARPAULINS will give you maximum satisfaction. Contractors Supply Dealers in every state sell the FULTON line. Specify SHUREDRY and FULTEX. FULTON products are good and prices are right. If your dealer can't supply you, write our nearest plant for catalog, samples and prices.

Fulton Bag & Cotton Mills
Manufacturers Since 1870
ATLANTA ST. LOUIS DALLAS
MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY, KAN.

Walter Tractor Trucks

TOUGH HAULING JOBS WANTED!

IF YOU'VE got to haul enormous loads through soft dirt, mud, sand, gravel, snow, deep rutted tracks or over broken terrain in all kinds of weather — you need Walter Tractor Trucks! The exclusive 4-Point Positive Drive System, patented Automatic Lock Differentials and Tractor Type Transmission give Walter Tractor Trucks their super-traction and full delivered power for any ground and any weather.

Walter Tractor Trucks have proved their value for years as trouble shooters for 'phone and power companies — hauling 40 to 50 ton loads at iron and coal mines — handling the toughest jobs of road building and maintenance — bucking snow drifts and clearing heavy snows from highways and airports. Wherever and whenever roads and weather are at their worst, you will find Walter Tractor Trucks hauling at their best. Write for detailed literature.

WALTER MOTOR TRUCK CO.
1001-19 Irving Ave., Ridgewood, Queens, L. I., N.Y.

Long Haul Is Problem In Depot Concreting

(*Continued from page* 1)

batching. The excess went to a second chute leading to a spiral conveyor on top of the cement storage building which fed it to the storage. A spiral in the bottom of the storage building fed the cement back to the bucket elevator when none was being unloaded.

The aggregate and cement batching units were entirely separate and in different structures. The batch trucks drove through under the aggregate batching unit and received the stone and sand, weighed out by one man, and then drove forward to the cement batcher to receive the cement and admixture. The aggregates were weighed by a 10,000-pound scales and adjacent was a water tank for measuring the required water by volume when the truck mixers operated direct from this plant.

In the cement batcher, one man weighed the cement by hand control of a plunger gate while a second weighed and dumped the admixture. The truck drivers centered the bodies under the delivery chutes by means of telltales hung so as to be at the side of the cab.

Two batches were made up, one for footings and the other for slabs, short walls and domes, and these were known as C and A respectively. The weights of the various materials were as follows:

4-Cubic Yard Batch	"A" Concrete	"C" Concrete
Sand	5,199 lbs.	6,066 lbs.
¾-inch crushed stone	2,829 lbs.	6,256 lbs.
1½-inch crushed stone	4,008 lbs.	.....
Cement	1,924 lbs.	1,128 lbs.
Water	150 gals.	160 gals.
Admixture	21 lbs.	12 lbs.

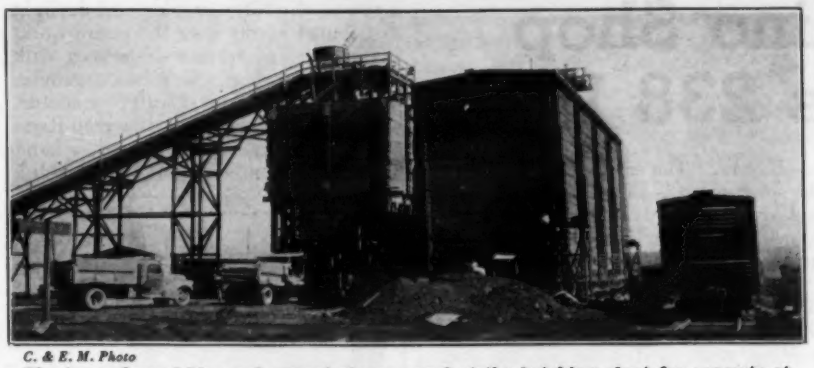
The Transfer Stations

Taking advantage of the rough character of the area, all transfer stations were built as side-hill structures, permitting the batch trucks to drive up over the hoppers and dump direct into the truck mixers. The framing of the transfer stations was heavy, using double 4 x 8-inch lumber for posts, and the hoppers in proportion. The two hoppers at each station were lined with metal to speed the delivery of the batches and were shut off with gates at the bottom, permitting storage of a batch if a truck mixer was not ready to receive it. A measuring tank, where the proper volume of water for each batch was measured prior to delivery to the truck mixer with the dry batch, completed the installation.

Only two men were required to operate a transfer station, one on top cleaning the batch-truck bodies as they delivered their loads and also watching to see that each load was dumped clean from the hopper into the truck mixer, while the man below operated the water and batch-release gates to the mixer trucks. A fleet of twenty 4-yard transit mixer trucks was used for hauling away from a transfer station.

Personnel

The concreting operations at this southwestern Ordnance Depot were all done by contract under the direction of the U. S. Engineer Department. In the interest of national security, reference to the location of or personnel connected with Army construction is omitted.



C. & E. M. Photo

The type of wood bins and cement storage used at the batching plant for concrete at an Ordnance Depot in the Southwest.

Robins Changes Name That Has a History

Announcement has been made of the change of name of the Robins Conveying Belt Co., Passaic, N.J., manufacturer and erector of materials-handling machinery. The new name, Robins Conveyors Inc., is more truly definitive of the scope of its products which range from idlers, pulleys, pillow blocks and other elements of conveyor systems to bridges, towers, car dumpers, vibrating screens, grab buckets, cable railways, and other large machinery for handling, stocking and reclaiming sand, gravel and other bulk materials.

At the time the original name was adopted by incorporation, back in 1896, there was a valid reason for its selection. Thomas Robins, founder of the business and still actively engaged as Chairman of the Board, created the first belt made expressly to convey bulk materials. The first troughed belt conveyor, and many other "firsts" are claimed by this company. Since the word "conveyor" had not been coined back in the 1890's (it is not found in many dictionaries, even at this date) the next nearest descriptive phrase was chosen; hence the original name Robins Conveying Belt Co.

There will be no change of management, personnel or corporate structure involved in this change, which is one of name only. The general offices and works of Robins Conveyors Inc. are at Passaic, N.J. Branch offices are maintained in Boston; Charleston, W. Va.; Chicago; Cleveland; Detroit; New York; Philadelphia; Pittsburgh; San Francisco; and Washington, D.C.

Complete line of gasoline, pneumatic and electric driven concrete vibrators and grinders
Write for information and prices

ROETH VIBRATOR COMPANY
1317 Farragut Ave. Chicago, Ill.

JAEGER PAVING TEAMS Have Made It Possible to Build Roads and Airports... *BETTER, FASTER, at LOWER COST*

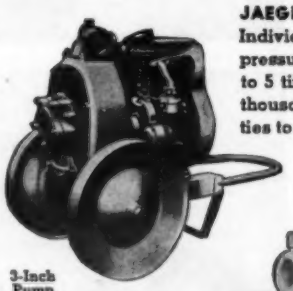
On 10-12 Ft. Slab

On 25 Ft. Slab

It is a recognized fact that the speed records made in paving concrete military roads and airport runways (exceeding 275 linear ft. per hour on 25 ft. width and 475 ft. per hour on 10 ft. width) have been made possible by the use of the finishing machine and the concrete spreader, both originated and developed by Jaeger-Lakewood engineers.

JAEGER RE-MIXING SCREW CONCRETE SPREADER, by replacing hand shovelers, makes it possible to handle and spread the stiffest concrete, as dry as ½" slump, as fast as dual drum or multiple pavers can mix and pour. Re-mixing spreader screw eliminates all segregation, densifies and improves the strength and uniformity of the slab. Single operator spreads the piles, strikes off, ready for final finishing. Also adaptable for spreading and finishing bituminous material.

JAEGER-LAKEWOOD HIGH SPEED FINISHER is the most flexible machine ever developed for finishing dry, stiff concrete at today's fast pace. Transmission in front of engine gives direct lever control of all functions—3 working speeds of 8, 12, 18 ft. per minute and 3 independent screed speeds, all gear-selected, plus unlimited speed range by engine throttle. Hydraulic screed lift, "velvet touch" screeding, 4-5 ft. telescopic width adjustment, many advanced features. Standard and vibratory models.

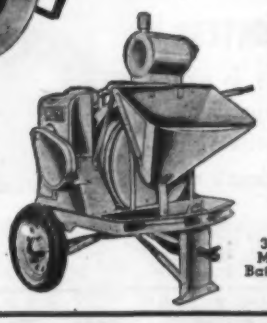


3-Inch Pump

JAEGER "SURE-PRIME" — *the Pumps that Exceed Their Promises:* Individually factory tested and certified for vacuum, capacity and pressure, regularly exceed their guaranteed performance — with up to 5 times faster automatic priming, big air and water capacity and thousands of extra hours of service. Sizes 1½ to 10 inches — capacities to over 200,000 gallons per hour.

10-Inch Pump

JAEGER PUMPS have patented high-velocity "Priming Jet," high pressure shells of self-cleaning design, replaceable liners, longest-life seal, oversize construction.



JAEGER "SPEEDLINE" MIXERS in sizes up to one-half yard, have machined steel drum tracks, enclosed automotive-type transmission, run more smoothly and quietly. Fastest known loading and discharge. Perfectly balanced, easy to trail and move on Timken bearing wheels, spring shock absorbers.

3½S with Measuring Batch Hopper

10S Non-Tilt Mixer

JAEGER MIXERS are the recognized leader throughout the world—for fast production, easy handling and long life, trouble-free service.

THE JAEGER MACHINE CO.

701 Dublin Avenue, Columbus, Ohio
Service in Over 100 Principal Cities

San Bernardino Shop Maintains 238 Units

Typical of Smaller Shops Of California Division of Highways; Is Well-Planned For Equipment Care

✦ THE California Division of Highways operates an Equipment Department under the direction of R. H. Stalnaker, Equipment Engineer, with headquarters in Sacramento. In each of the eleven highway districts, a shop is maintained where all trucks and construction and maintenance equipment are stored, overhauled, and rented to the District for such services as are required. The District puts its own operator on the equipment and furnishes all fuel anl lubricants. The rentals paid cover the cost of replacement and maintain the equipment during its useful life.

The shop at San Bernardino is one of the medium-sized equipment shops of the Division of Highways, having 238 pieces of highway equipment in its care and an inventory of around $600,000, which is about two-thirds the figure for the Los Angeles and Redding shops, the two largest in the state.

Administration

The San Bernardino shops are in charge of Albert A. Hilton, District Superintendent of Equipment, with four office assistants and seventeen men in the shops. The office force consists of a supervising account clerk, a bookkeeping-machine operator, an intermediate account clerk and an intermediate stenographer clerk. In the shop the distribution normally includes: nine automotive mechanics, of whom three are part-time welders; one machinist; one blacksmith; a storekeeper and an assistant; a janitor; a laborer; and two automotive mechanics' helpers.

The shop is open daily, except Saturdays, from 7:30 to 12 noon and 12:30 to 4 p.m. while the office is open every day but with only a skeleton force on Saturdays, so that each member of the office staff works one Saturday in four. The office hours are 8:30 to 12:06 and 1 to 5 p.m. The reason for the extra six minutes is that it makes up for time off on Saturdays so that no pay is lost to the employees by having three out of four Saturdays free. The Saturday hours are 9 to 12.

Stock Room

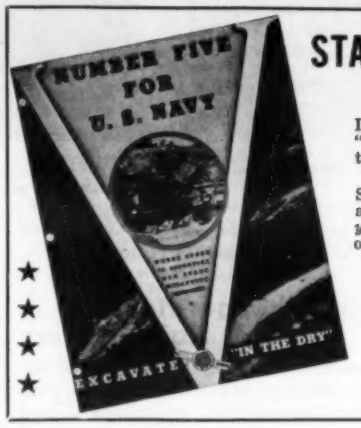
The stock room is maintained in excellent condition with the aid of steel bins for all the small parts. Each bin is numbered to correspond with the card in the perpetual inventory system which has a total of over 1,500 cards for this shop. The bulk of the lubricants are kept in the stock room as the Equipment Division does not have use for them except for repair purposes. All machine tools for work on the equipment are issued from the stock room by check, and shop requisitions are required for the issuing of any parts or materials. These must be approved by the foreman before they will be honored by the stockroom clerk. The small stock of tires in the stock room is kept chained and padlocked so that only the single clerk responsible for their issuance may release them.

A few heavy items and bulky materials are kept in a separate locked stock room. These include additional tires, welding rods, and some of the janitor's supplies. The latter are the only materials issued and charged in bulk; all items except janitor's supplies are charged as issued.

The Service Shops

The building which includes the machine and other service shops and the office and repair garage is 120 x 60 feet with an extra 20 feet for the blacksmith shop at the end of the building. It has a saw-tooth roof, with plenty of daylight distributed evenly over the entire working area. The service shops start with the machine shop which has a grinder and buffer, a drill press with four speeds, a hand arbor press, an Ingersoll-Rand electric-driven shop compressor, a hand press for bending and straightening small pieces, a bench drill, a power milling machine, a power lathe with a 6-foot bed, a larger drill press, a shaper, and in the corner of the machine shop a section is wired off for the electric shop where distributors and magnetos are repaired and a Tungar charger is installed for

(*Concluded on page 47*)



STANG WELLPOINT EQUIPMENT

In War and in Peace

In war and in peace, contractors and engineers "in the know" use STANG Wellpoint Equipment to keep construction jobs "in the dry."

Write for this *"V" Bulletin* and read how STANG Wellpoints are *speeding the war effort* and *cutting war costs*—just as they can speed *your* jobs and cut *your* costs if you are a builder of drydocks, tunnels, dams, pipe lines or sewers.

FOR SALE OR RENT

JOHN W. STANG CORP.
NUMBER TWO BROADWAY, NEW YORK CITY
BRANCH OFFICES:
2322 Newton Avenue, San Diego, Calif.
2310 Calhoun St., Houston, Texas

VULCAN TOOLS
A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.
35-43 Liberty Street, Quincy, Mass.
Branch Offices and Warehouse Stock:
74 Murray St. New York, N. Y.
34 No. Clinton St. Chicago, Ill.

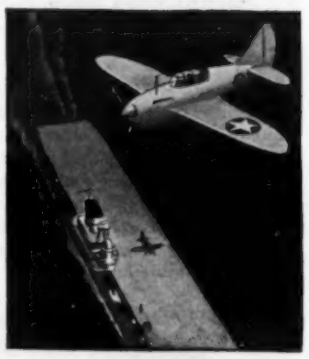
WIRE ROPE FIGHTS AT SEA

TRAPPING U-BOATS

When a Nazi U-boat sneaked into Scapa Flow and blasted Britain's big carrier *Royal Oak* to the bottom, the loss underlined the fact that to block U-boats out of a harbor, you've got to lock it up tight—not just with mines but with elaborate nets made of strand. Keeping harbors closed to undersea marauders is one of Bethlehem's war-time jobs. Our wire-rope mill has been turning out large quantities of harbor-defense strand—a high-strength strand of special construction, and with the famous bethanized electrolytic zinc coating.

TOSSING FIGHTERS INTO ACTION

An aircraft carrier, as everybody knows, houses its fighter planes and bombers on the hangar deck, which is directly beneath the flight deck. When an attack alarm comes in, those planes must get from hangar deck to flight deck and into the air in almost less time than it takes to tell about it. Special Bethlehem wire rope is used in the high-speed plane lifts of some of America's biggest carriers.



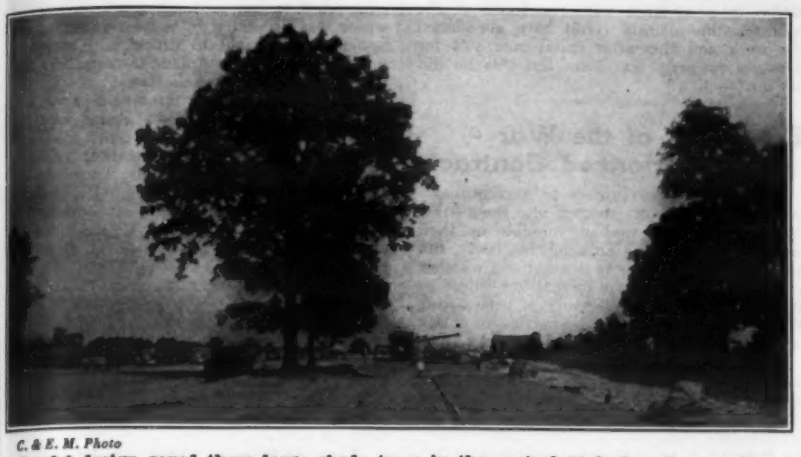
TOWING DAMAGED FREIGHTERS

Every cargo vessel in a convoy is now equipped with two husky towing hawsers, installed in such a way that they can be rushed into action at a moment's notice. If a vessel is struck and crippled by a torpedo, one of the emergency towing hawsers is attached to a sister ship and the damaged vessel is brought safely into port. Bethlehem has had a lot of peacetime experience in building strong, corrosion-resistant towing hawsers. United Nations' convoys are benefitting from that experience now.

★ ★ ★

In hundreds of jobs on sea and on land—ships' rigging, aircraft-control cord, minesweeping cable, mine-anchor cable, and naval dredge rope, to name a few—Bethlehem Wire Rope is helping to win the war. There are also pressing needs for Bethlehem Wire Rope on the home front—in war factories, mines, timber lands, construction jobs, and oil fields. We are doing our level best to keep everybody adequately supplied. The job is enormous. If you have to wait to get delivery on your rope, we hope you'll keep that in mind, and bear with us.

Bethlehem Manufactures Wire Rope for all Purposes



C. & E. M. Photo
Careful design saved these large shade trees in the central 30-foot mall on a dual access road running north from Dayton to Vandalia, Ohio.

Road Funds Invested In Govt. Securities

Announcement has been made by Governor Coke Stevenson of Texas of the investment by the State Highway Commission of $15,000,000 of reserve highway funds in Federal Treasury certificates to aid in financing the war. It was emphasized that the funds are not "surplus" funds, but those reserved for contract obligations and which are not now so expendable due to the war. This action conforms to the terms of SB 199 which was passed unanimously by the Texas Legislature and approved by the Governor on April 12.

The investment in certificates, which may be redeemed at the option of the holder, maintains the highway funds in a fluid condition so that work on the outstanding contracts may be resumed without delay at such time as the limitations due to the war are relaxed.

In line with recommendations made by the Governor in his message to the Legislature and with the Legislative intent expressed in the adoption of two bills outlining a procedure for post-war planning and approving specifically post-war highway construction, the Texas Highway Commission is endeavoring to build up a financial backlog which will be available at the end of the war to undertake normal construction delayed by the war and on which the Department has outstanding commitments and to provide also for reconstruction of the main highways which are suffering severe damage through the movement of unusually heavy war loads.

The Highway Department engineers are now studying those projects deemed most essential for post-war construction and are moving these projects through the preliminary stages so they may be undertaken with a minimum of delay. According to preliminary surveys submitted by district engineers, the total of these projects approximates $300,000,000.

Submersible Pumps On Unwatering Jobs

When it comes to unwatering a cofferdam or pumping from any sump, it saves time to be able to "dunk" the pump and let it go to work without further attention. Bingham Submersibles are built for this service so as to eliminate supporting scaffolds, floats, barges or platforms. All that is necessary, according to Bingham Pump Co., Portland, Ore., manufacturer of Bingham Submersibles, is to place the pump in a vertical position at the bottom of the sump with the discharge and power lines connected and turn on the current.

These pumps are equipped with strainers just above the pedestal base to protect the pump vanes, and the pump starts and stops automatically, maintaining the water at a predetermined elevation. The Submersibles operate in either air or water, are built in a wide range of capacities, have no pump bearings or stuffing boxes, and use 220 or 440-volt 3-phase 50 or 60-cycle current.

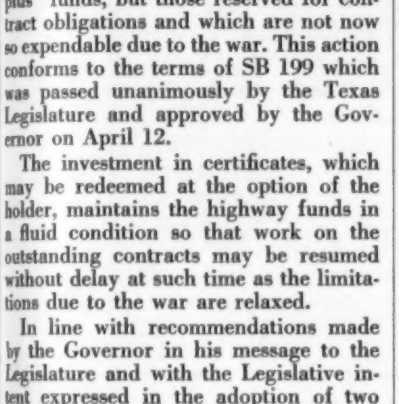
Full information and a copy of Bulletin No. 65 on these amphibian pumps will be sent by the manufacturer on request to those mentioning this descriptive text.

Welding Society Issues New Edition of Handbook

The second edition of the Welding Handbook, just published by the American Welding Society, is offered in response to a demand for general up-to-date information, in concise form, on the subject of welding. The data it contains are arranged in six general divisions: first, the physics and metallurgy of welding and the weldability of steels; second, the welding and allied processes; third, the materials used; fourth, training, inspection and safety; fifth, design considerations and testing of welding; and sixth, the applications of welding.

Although the volume is designed as a handbook, the material has been arranged in a logical sequence with enough explanatory matter so that it may be used as a textbook in engineering schools and as a reference book in trade schools. Its primary purpose, however, is to give engineers an authoritative up-to-date reference book on the technical phases of welding.

Extra copies of this Welding Handbook are available to members of the Society at a price of $5.00. Non-members may secure copies direct from the American Welding Society, 33 W. 39th St., New York City. Price: $6.00 in the U.S.A.; $6.50 elsewhere.


BARTLETT MFG. CO.
3015 E. Grand Blvd.
DETROIT, MICH.
Combination
Pruner & Saw
AVAILABLE
ON PRIORITIES
EASILY CARRIED IN SMALL CAR OR MOTORCYCLE
Length Weight
20 in. Pruner 2¾ lbs.
30 in. Saw 1½ lbs.
48 in. Section 1½ lbs.
48 in. Section 1¼ lbs.
Total Weight 7 lbs.
This combination can be quickly and easily assembled to make either of these two tools:
1 Heavy Duty Tree Trimmer (144" reach) 15¼ ft.
1 Fast-cutting Pole Saw 10½ ft.
If longer lengths are required, specify extra sections 6 or 8 ft. long, or additional 4 Ft. sections to make the necessary length.

"THEY ALSO SERVE"
who keep
Construction Machinery in
"Fighting Trim"
AUSTIN-WESTERN
MOTOR GRADERS
ROCK CRUSHERS
STREET SWEEPERS
MOTOR ROLLERS
HYDRAULIC &
CABLE SCRAPERS Etc.
• Not until the whole story of the outstanding job done by construction machinery in speeding the war effort in this Country can finally be told, will the importance of the part played by the Equipment Distributor be fully realized.
Faced with shortages of men and material, the Distributor and his staff, in shop and field, have done the impossible, time after time, in keeping equipment working.
Much of the job of construction for military purposes is finished; but much remains to be done—and with machines which have already served one life of usefulness.
Your nearby Austin-Western Distributor, with his skilled mechanics and adequate shop facilities, stands ready to help you finish this truly epic job of home front construction for war. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.
BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

Excavating Contractors Frequently "Gamblers"

The Kentucky Court of Appeals notes a distinction between the rights of an excavating contractor to extra compensation when he runs into difficulties due to unexpected subterranean rock and when he encounters artificially created obstructions. (Miller v. Johns, 163 S. W. 2d, 9.)

The court reaffirmed its decision in an earlier case, that the mere fact that rock is unexpectedly encountered gives the contractor no right to extra pay. (The court seems to assume that the contract contained no special escape clause and that the owner had not guaranteed, concealed or misrepresented subterranean conditions.) The court said, in the earlier case:

"Where a contractor undertakes to excavate a lot his contract is known as a 'chancing contract', but that rule applies only in cases where the difficulties encountered are natural and could not reasonably have been anticipated by either of the parties to the contract. If the natural formations are different from what was expected by the contractor, he can not claim extra compensation because of the increased cost of doing the work. But we find no case applying the rule where there is an artificial obstruction concealed under ground which was known to the owner and unknown to the other parties. Here we have hidden concrete and marble well concealed by the surface of the lot, and that surface, which concealed the obstruction, had been made by the owner."

Contractor Must State Third-Party Interest

As a general rule a contract between two parties gives no rights in favor of a third. There must be something in the wording of the agreement that indicates a purpose to benefit outsiders. In the construction field, the most common example of instances in which third parties are beneficiaries, by reason of express or implied provision in the contract, is where a contractor agrees to pay all labor and material bills.

A case decided by the Appellate Division of the New York Supreme Court goes a long way in excluding third-party benefits. A barge canal construction contract with the State contained this clause: "The amount of explosives to be used and the quantity to be kept on hand and the precautions to be taken by the contractor shall at all times and places be such that no damage shall be done to any person or property." The court ruled that this provision did not make the contractor liable for the deaths of three young men, outsiders, due to explosion of dynamite, even if the quoted clause had not been observed by the contractor. The court said:

"Plaintiffs' intestates had only an indirect interest in the performance of the contract between defendant and the State of New York. They had only incidental benefit which every citizen of the State or person who came in the vicinity of the dynamite had in the performance of the contract. For the breach of that contract they did not have a private right of action, nor have their administrators." Prescott v. Collins, 35 N. Y. Supp. 2d, 135.)

Contract Clause No "Joke"

Any clause in a written construction contract that has a tendency to avoid litigation will be seriously regarded and seriously enforced by the courts. A contractor who assumes that any particular provision is a mere formality, with which compliance is not necessary for the protection of his rights, is climbing out on a limb that is apt to bring him to the ground with a sickening thud.

The decision reached by United States District Judge Chesnut in the case of Schiavi v. Mayor and City Council of Baltimore, 40 Fed. Supp. 184, well illustrates the point. A storm drain contractor lost a suit for extra compensation because he failed to comply with a contract requirement that the engineer's decision should be secured before proceeding with work claimed to be outside the contract. After stating that such clauses are designed to avoid litigation, and that plaintiff showed no good excuse for failing to comply, Judge Chesnut said:

"If, as he contends, he was required during the performance of the contract to do work and supply extra materials not called for in the contract, he had the option to refuse to do so unless the extra compensation was agreed to by authorized city officials, and if they unreasonably refused to allow the extra compensation in accordance with the terms of the contract, the plaintiff could have abandoned the work and thereafter maintained suit for damages properly due him. But this he did not do."

The Effect of the War On Unperformed Contracts

All contracts are subject to a condition—even though it is not written into them—that they shall become void or voidable on their performance being prohibited by law. But difficulty is apt to arise in determining whether a particular war regulation has the effect of merely postponing performance of pre-existing contracts, or gives one of the parties an option to cancel.

As to current "freezing orders", there is at least one court decision to indicate a probability that in any case where it is clear that the parties to a contract contemplated prompt performance, either has a right to cancel where the freezing is to continue indefinitely or for the duration. This would seem to apply to the contractor's agreements for the purchase of materials and equipment not covered by priorities, as well as to any construction contracts he may hold.

The decision above mentioned was rendered by the Rhode Island Supreme Court in the case of Cinquegrano v. T. A. Clarke Motors, Inc., 30 Atl. 2d, 859. There one who had contracted to buy a motor truck, delivery of which was prevented by a freezing order, was upheld in his right to cancel and recover a down payment he had made to the seller. The gist of the decision is as follows:

"Having in mind that this was a purely executory"—unperformed—"and entire contract, calling for delivery of a specific model of motor truck, the use and market value of which, as a matter of common knowledge in this country, becomes substantially and increasingly affected by the lapse of time; and that the consideration involved another type of automobile, subject also to variations in value, plus a specified amount of cash, the enforcement of such order went to the essence of the contract by affecting its mutuality and consideration. The effect of such order clearly was not to suspend the terms of the express contract entered into by the parties, so that it could be ultimately enforced, but rather to require the performance of a new and different contract to be imposed upon them by law.

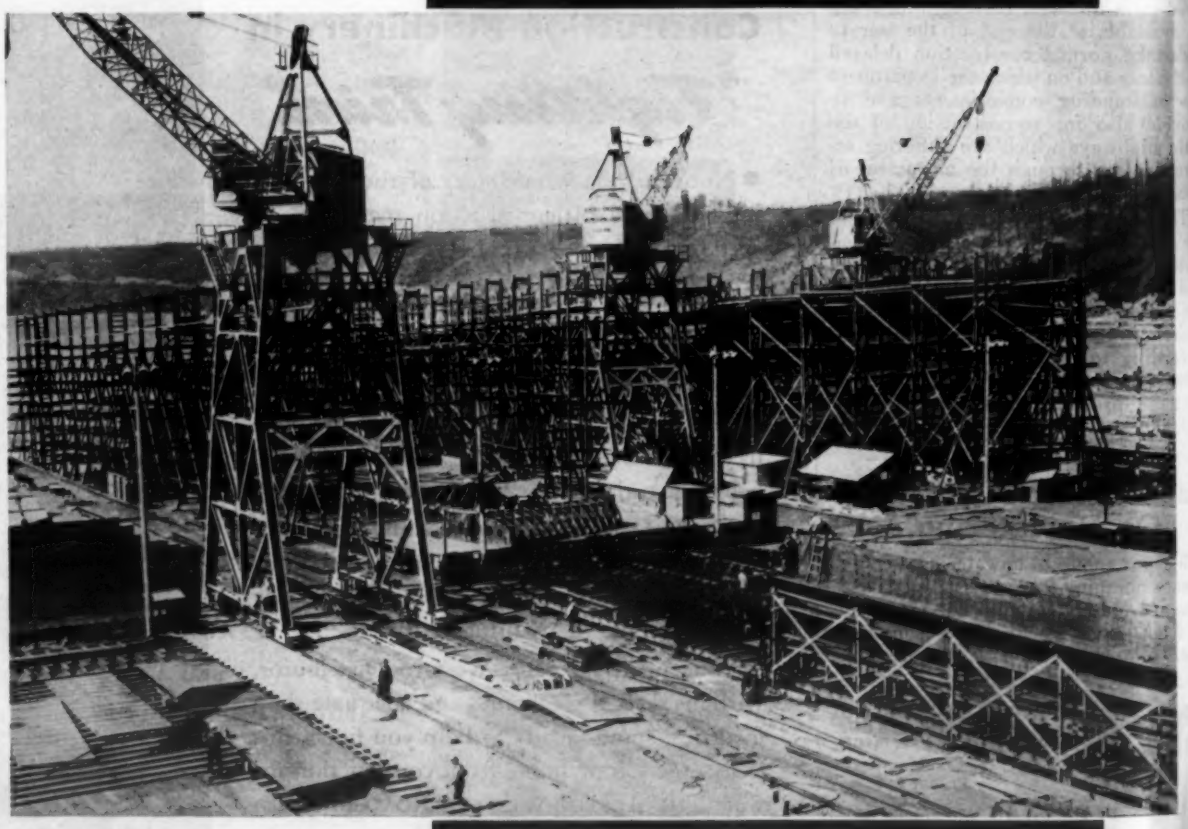
"When, as here, a supervening lawful order of domestic government makes performance of an existing contract illegal and the enforcement of such order for an unreasonable time admittedly interferes substantially with the expressed intention of the parties and renders impossible the performance of the terms of the original contract, a party who is not at fault is justified in demanding return of the purchase price he has paid thereunder."

Building for Victory

Wartime construction and production demands full efficiency in every material handling unit. Clyde equipment have time proved their dependability on all kinds of jobs. Their rugged construction, scientific design and unexcelled performance records, assures a continuous and safe working schedule. . . . day after day . . . month after month.

This year, more than ever before, ultimate speed in building and in handling materials and supplies, is of paramount importance.

A new Bulletin L-12, showing Clyde Whirleys handling materials at shipyards, construction projects, industrial plants and loading depots, is available. Write for your copy.



ARMY E NAVY

For High Achievement

CLYDE

CLYDE IRON WORKS, Inc.

Duluth, Minnesota

UNIVERSAL

ARC WELDERS

Electric & Motor Driven 200, 300 and 400 Ampere and Gasoline Driven 200 and 300 Ampere available for

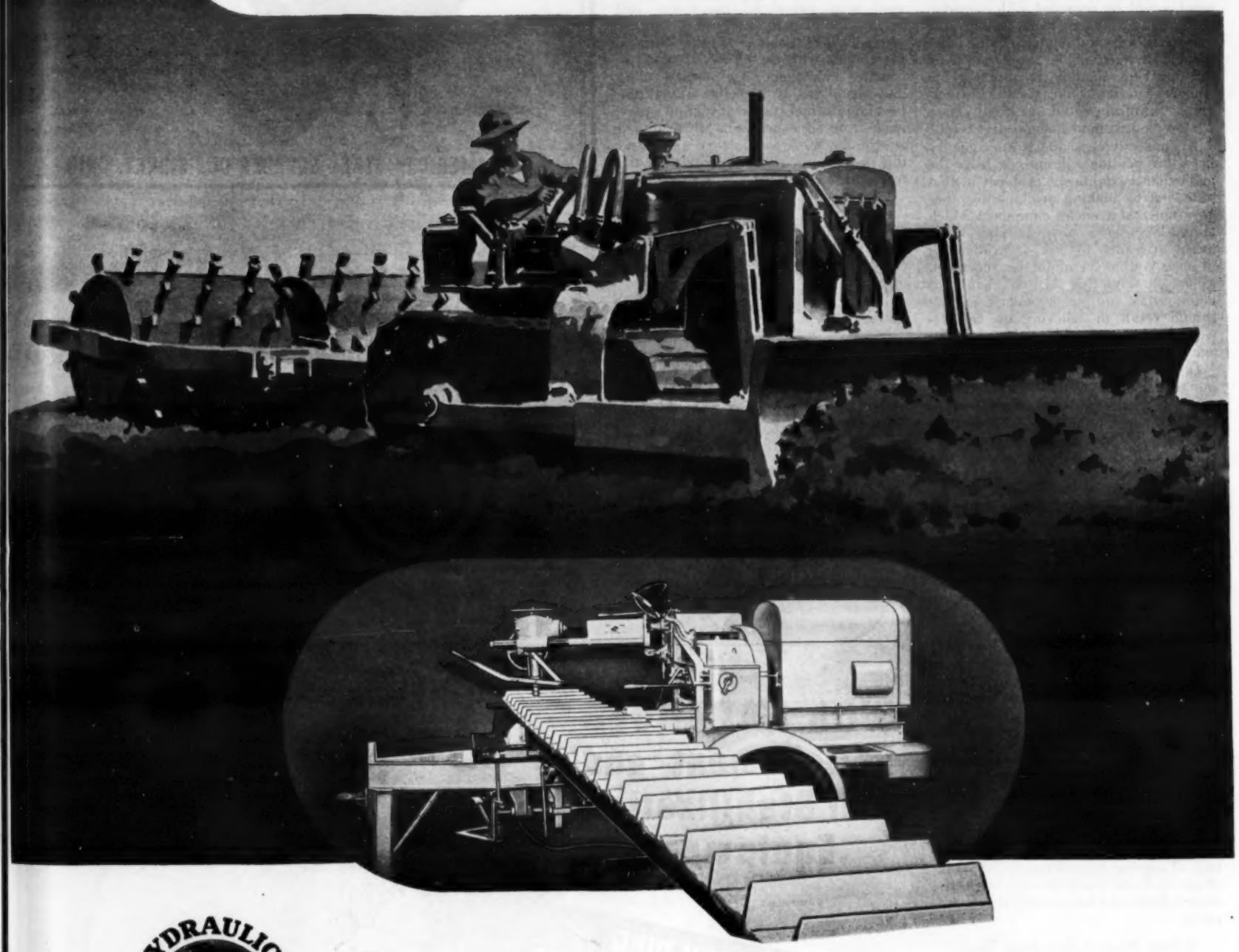
PROMPT DELIVERIES

Inquire concerning quick deliveries on Welding Cable and Electrodes and Gasoline-Diesel power units up to 187 KVA.

UNIVERSAL POWER CORPORATION

4297 Euclid Ave. Cleveland, Ohio

To Construct Better Roads!



HYDRAULICS Rodgers KEEP THE WORLD MOVING

Manufacturers of:
UNIVERSAL HYDRAULIC PRESSES
TRACK PRESS EQUIPMENT
HYDRAULIC KEEL BENDERS
HYDROSTATIC TEST UNITS
POWER TRACK WRENCHES
HYDRAULIC PLASTIC PRESSES
PORTABLE STRAIGHTENER FOR PIPE AND KELLYS

TO CONSTRUCT BETTER ROADS and to help take care of your present crawler type tractors, Rodgers Hydraulic Track Press Equipment with the "Retractable Jaw" is available to contractors having essential work to do. ★ Shown in the illustration above is a Rodgers Trailer Track Press equipped with four-cylinder Hydraulic Pump powered by a four-cylinder Gas Engine. Note convenient position of controls and ample working space for operator. ★ Rodgers Track Press Equipment is recommended and approved by the Engineering and Service Departments of every crawler tractor manufacturing company. ★ Following the tractor manufacturer's recommendations is the purchaser's assurance that he will have the finest equipment available for this service. ***If it's a Rodgers, it's the best in Hydraulics.*** Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.

Rodgers HYDRAULIC Inc.

Highway Depts. Answer Questions on Pooling

(*Continued from page 26*)

better position to coordinate such a plan if, but only if, the Federal Government issues such directives.

"Since state coordinators could not enforce rules and regulations without Federal backing, it would seem that the Federal backing should be locally represented. . . . Any state highway department would be regarded with considerable prejudice if they alone attempted to enforce a Federal directive. On the other hand, if they attempted to operate without any Federal authority, nothing but embarrassment would result. Furthermore, California could not legally operate the plan without Federal directives."

Kentucky reports that it does not believe that pooling will entirely solve the maintenance-equipment problem in that state, but by making available to other governmental agencies equipment which might be needed, any emergency that might arise due to lack of availability of such equipment might be alleviated. Minnesota says that the interchange of maintenance equipment under this plan should result in relieving the maintenance-equipment problem where a shortage exists.

On the other hand, Idaho states, "Pooling on the scale contemplated will not solve the maintenance-equipment problem in Idaho. Pooling, we feel, requires adequate modern equipment, a closely knit organization, ample personnel, a surplus of equipment available for assignment, and centralized operations requiring the least possible dead hauls. In none of these aspects does pooling qualify in Idaho." The same problem is raised by Colorado, where, it is pointed out, the size of the state and the limited amount of equipment now owned by state, county and city governments prevent any successful pooling arrangement.

While in theory the pooling plan seems to be the solution of the problem of limited equipment, there is great waste in the operation of such a plan if heavy equipment must be transported long distances. Loss of time, needless use of gasoline and tires, and additional wear and tear on the highway result. Today, with the manpower shortage and the necessity of making present equipment do the job, the allocation of working time of both men and machines is extremely important, and the disadvantage of wasting days in transporting machines and men about the state offsets the doubtful value of borrowing extra equipment.

Where Pooling Has Been Tried

In a number of states, some form of "pooling" has been used for a good many years, carried on on an informal basis generally, and arranged to meet conditions as they arise. Pennsylvania, for example, has been operating for a number of years on the principle of pooling equipment: that is, state equipment not in use is available to the municipal subdivisions of the state at a reasonable rental price, and likewise the Commonwealth has rented from the townships and boroughs such idle equipment as may be needed by the operations of the Commonwealth. The rental schedules used are those agreed upon between the Commonwealth and the subdivisions. Wisconsin reports that it has always pooled its maintenance equipment and will continue to do so when the necessity arises.

From the Vermont Department of Highways comes the report, "There has always been a free interchange of equipment, as needed, between the various towns as well as between the towns and the state. To aid in this work, we are setting up at this office a schedule of all equipment owned by the towns and various municipalities." New Hampshire states, "No formal arrangements have been made with the cities or towns regarding maintenance-equipment pooling and rental, as it is believed that the present informal system of renting equipment from adjacent towns when needed is still the most satisfactory answer to this problem. Neither the cities nor the towns have expressed any desire to participate in a formal pooling plan."

For the past six years the counties in Kentucky have cooperated with the Rural Highway Division of the State Department of Highways, and in such cooperation much equipment has been purchased for the counties. At the present time any equipment which they might need would be available to those counties through the Rural Division, and in some cases the state has used county equipment. The towns in Kentucky have not been officially contacted in regard to the WPB pooling plan, but by arrangement with WPB any equipment requests

(*Continued on next page*)

AMERICAN WHEELBARROWS
With Steel Wheel
for WAR ORDERS

Write for Bulletin

Barrow shown is the American No. 1—4 cu. ft. struck capacity DeLuxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....PERFECT-$

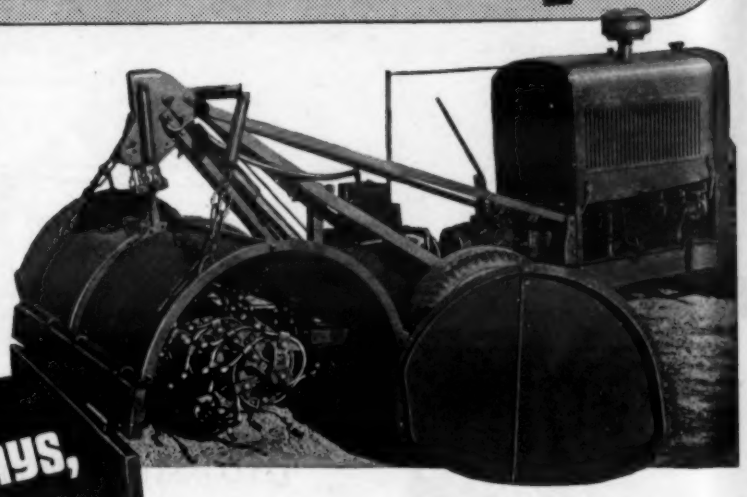
THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

THE PIONEER STILL LEADS THE FIELD

ROTOTILLER

TRADE MARK REG. U.S. PAT. OFF.

ROADMAKER



With IMPROVED Soil-Cement and Soil Stabilization Equipment

FOR BUILDING HIGHWAYS, RUNWAYS, FLIGHT STRIPS *faster, better!*

BACK in the 30's this original "3-in-1" Rotary Action Tillage Machine was used on early experimental projects in soil-cement construction.

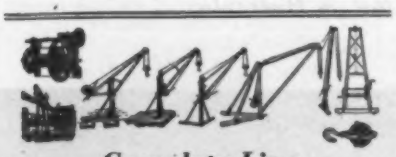
The landing fields and roads built then are still in use, in sound condition. They've taken the extremes of weather, the abuse of traffic. And each year since then ROTOTILLER Roadmaker has kept pace with developments in soil-cement and soil stabilization work by constant improvement in machine and method.

ROTOTILLER Roadmaker is engineered to exacting automotive standards. It is sturdy, powerful—ruggedly built to meet today's exacting war-time demands.

Contractors and engineers engaged in military construction are urged to get all the facts on this improved 1943 job-tested ROTOTILLER Roadmaker. Write for literature.

Post war plans undoubtedly will call for thousands of miles of soil-cement and soil stabilized secondary roads. Returning soldiers will find economic security in this work. Then, as now, ROTOTILLER Roadmaker will serve faithfully and well.

DEPT. N **ROTOTILLER, INC.** TROY, N.Y.



Complete Line of DERRICKS *and* WINCHES

HASGEN DERRICK CO.
3191 W. Grand Ave. Chicago, Ill.

Pooling of Equipment Presents Many Problems

(*Continued from preceding page*)

from a town are referred to the Highway Department. The results of the Department-county cooperation of the past few years have been very satisfactory, and it is believed that such a plan has considerably reduced the amount of equipment necessary for the Department's operation as well as for the various counties.

Georgia replies, "We do not feel that the pooling of maintenance equipment is the solution to the maintenance problem in Georgia. The cities and counties of the state are very cooperative but the majority of these have disposed of surplus equipment to the War Production Board. However, we have been able to work out our special problems with the cities and counties where additional equipment was needed and, where we could, we have furnished this equipment to the cities and counties. The rental schedule used in the exchange of equipment is that established by the OPA. We do not have sufficient personnel to set up a pooling arrangement and prefer to work out our equipment problems as they arise."

In Massachusetts considerable lending of equipment has been done in the past between towns and cities and many feel that to continue the present practice would be sufficient. All are opposed to Federal dictation. The Department of Public Works has established rates for equipment rental which are used in connection with State Aid to cities and towns where financial aid is granted on the basis of expenditures, such expenditures being supervised and checked by Department engineers. The rates have been standardized to simplify the supervision and checking. Two schedules are used, one for town-owned or city-owned equipment and designed to cover operating costs, exclusive of the operator, and depreciation only; the other for hired privately-owned equipment and including complete operation.

Maryland reports, "We are pooling our own equipment and have made it available for transfer from one section of the state to another under any emergency conditions that may arise. We are also, when requested, making rentals to counties, townships or to Federal agencies but the requests made up to the present time have been very few. Under the circumstances, we do not think it justifiable to go into a complete inventory of all equipment by all agencies and the necessary records for usage of all equipment in the state at all times, which would involve a considerable amount of overhead by our Commission to keep these records up to date."

Minnesota points out that over a period of years, the counties of that state have, under the direction of the State Maintenance Engineer, pooled their equipment whenever necessary. It has not been necessary to do much of this, and the need for it is not anticipated, inasmuch as each county is in a condition to continue to maintain its highways for a considerable period, if it can get repair parts, blades, etc.

Special State Problems

There are a number of special problems arising in some states when such a pooling plan as suggested by WPB is considered. Some states are exempt at the very start, since they own all or practically all the road maintenance in the state anyway. This is true in Maine, Virginia, New Mexico, West Virginia, North Carolina, and Delaware.

In at least two states, Alabama and New York, an equipment pool is impossible without a change in state legislation, as under existing set-ups the state has no authority to institute such an arrangement. In California such a plan could not legally be operated without Federal directives.

There is also the point brought out by a number of state highway engineers that for the state highway departments to be given the authority to move around the equipment owned by counties and municipalities would only result in ill will. In some cases, towns and counties feel that there is plenty of supervision by the state highway department as it is, and would resent any further encroachment on their autonomy.

In New England, the counties do no highway work at all, and therefore the only governmental agencies other than the state are the towns and cities. In North Carolina, Virginia and West Virginia, practically all highway work is done by the state highway departments.

What Is Needed?

The concensus of opinion seems to be that there are special needs for handling highway maintenance in the war years ahead of us, but none of them is a formal Federal government equipment-pooling plan.

Indiana says, "We would like to suggest that, rather than establishing a board for the pooling of equipment, the WPB establish one in each state to secure repair parts for the equipment owned by government agencies and used in the maintenance and necessary construction of their roads. While we might set up a system for the pooling of equipment, 50 per cent of this and other equipment might be idle because parts cannot be secured for repairs. In other words, we believe, generally speaking, there is sufficient equipment within each

(*Concluded on page 57*)

DANDUX

Canvas Products

Built to exacting quality standards, of finer materials, Dandux Canvas Products have earned recognition and preference in the construction field during the past quarter century.

Their superior construction assures longer life, greater durability and service, yet they cost no more than the ordinary.

For your requirements of Tarpaulins, Covers, Bags; in fact, *anything* of canvas, consult our nearest office, and let us prove that the Dandux trade-mark assures you of greater value!

C. R. DANIELS, INC.

Manufacturers of Everything of Canvas

44 West St., New York, N. Y.

CHICAGO Boston Buffalo Cincinnati — DALLAS Cleveland Detroit Newark — LOS ANGELES Philadelphia Pittsburgh & Other Cities

Cotton Duck Mills: Daniels, Md.

LET YOUR DISTRIBUTOR HELP WITH SPECIAL WARTIME DIGGING PROBLEMS

Your Bucyrus-Erie distributor can help you meet the demands of today's high-speed 3-shift operation. His job-experienced organization can often help your over-loaded executives in planning jobs so they can be done in the shortest possible time. If new equipment is not available, he may know of used units which can be rented or bought. His skilled service men can work with you in getting the most out of your equipment.

Whenever you have a dirt-moving problem, call on your distributor. He may not have the answer every time, but his entire organization is ready to do everything it can to help. Your distributor's job is to help you with your job.

ARMY E NAVY

Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. * *

Bucyrus-Erie

SOUTH MILWAUKEE • WISCONSIN • U. S. A.

3-Way Preparation For Maintenance Top

New Mexico Precedes Seal By Base Strengthening and Patching to Insure Long Life for New Topping

✦ REALIZING that it was behind in its maintenance program, and playing a good hunch, the New Mexico State Highway Department in 1941 decided to reseal 470 miles of road-mix and penetration-macadam highways. In order to complete this ambitious program without buying too much new equipment, a total of 171 miles of the resealing operation was done by contract. The longest contract awarded to a single company was 55.5 miles on U. S. 85 north of Las Cruces.

To insure a life of at least five years for the maintenance seal, all local breaks in the surface were repaired and all weak sections of base were rebuilt. One section 40 miles in length on U. S. 66 had 10 inches of crushed gravel added to reinforce the base.

State Preparatory Work

Three methods were used, giving various degrees of repair to the base and surface by floating crews kept together in each district to insure the best possible work. All three of the methods might be used in one section from 30 to 40 miles in length. The first action was to send out the six portable crushing plants to the places where the work was to be concentrated in order to build up stockpiles in advance of actual reconstruction. These outfits are state-wide plants not confined to any one district. Each plant has a crew of from 25 to 30 men to operate the plant in three shifts.

The central and western part of the state has an abundance of gravel while the eastern section has to rely more on crushed stone. The railroad situation never has been good in New Mexico as there are few lines operating through the state and those do not cover the entire area. This makes it necessary to establish the stockpiles wherever the work is to be performed to minimize the haul. The asphalt used sometimes has to be hauled as much as 75 miles from the nearest siding available.

The first actual work on the road to be resealed is done by a pioneer repair crew which corrects small base failures, patches the surface, and goes as far as possible to replace entire damaged sections. This crew consists of 10 to 15 men with a foreman, working under the direction of the District Engineer. They operate one shift a day of 10 hours and are equipped with two trucks, one or two power graders, a 5-ton roller for the minor repairs, and pre-mixed material for the patches.

Where reprocessing of the top is necessary, the crew is equipped with four to six motor graders, a distributor, two booster tank trucks, a crawler tractor and a sheepsfoot roller. To cut up the old oil cake, sections of old grader blade are welded to the feet of a sheepsfoot roller normal to the axis of the roller so that they act as knives to cut the surface. The surface is reworked as a regular oil-mat.

The heaviest maintenance operation in preparation for resealing is when it is necessary to tear up the entire oil-mat, from 2½ to 3 inches thick, and break it up into pieces about 6 inches long with the sheepsfoot cutter blades, blade the entire old oil-mat to the side and add from 6 to 12 inches of gravel to strengthen the base. The old oil-mat material is then bladed back onto the road, processed with the new gravel, and laid out on the subgrade. It is then watered and rolled by a sheepsfoot roller to form a new base. The old oil-mat is not worth saving under these base conditions as it has usually broken badly due to the poor condition of the base. A brand new oil-mat is then constructed, using stone of ¾-inch down through the 200-mesh screen size, with the latter not more than 4 per cent of the total. This is mixed with cut-back oil to give a mat 2½ inches thick with the bitumen running 4 to 5½ per cent. This surfacing is rolled by an 8 to 10-ton steel-wheel roller with no pneumatic rolling except that provided by traffic which is allowed on the road as soon as the steel-wheel rolling starts and thus aids in the compaction.

The Retread Seal

The sealing operation has been referred to as simple sealing, or resealing, and also as retread. As the surface produced by this method is only about ¾ inch thick, it is probably best referred to as a heavy seal or non-skid surfacing. The work is done at the rate of about 4 miles a day by one crew completing one half the road first so that traffic is not disturbed and then going back and doing the other half. The asphalt is applied 10 feet wide by the state's own Etnyre or Kinney distributors not more than ¼ mile ahead of the application of the chips. The 200 to 300-penetration asphalt is applied at a rate varying from 0.25 to 0.35 gallon per square yard.

(*Concluded on page 63*)

HOISTS

STEAM • ELECTRIC
GASOLINE • DIESEL
AND
BELT DRIVEN

- FOR OVER 69 YEARS WE HAVE BEEN BUILDING FINE HOISTING MACHINERY
- OUR DUPLICATE PART SYSTEM INSURES PROPER FIT OF OUR FACTORY BUILT REPLACEMENTS
- FOR THE DEFENSE AND OFFENSE WAR EFFORT KEEP YOUR PRESENT HOIST IN GOOD WORKING CONDITION

We can help you!

We proudly fly these flags

MANUFACTURING COMPANY
Main Office and Works ELIZABETH, NEW JERSEY

SPEEDING UP U.S. NAVY AIRPORT CONSTRUCTION

HERE one mile equals fifteen. This Normal Duty Barber-Greene Mixer is mixing sand asphalt for runways over 300 feet wide and 6" thick. There's a big job to be done, and the Barber-Greene is doing it with speed, economy, and perfection. Rated at 1¼ to 1¾ yards per minute in the B-G Catalog, this Normal Duty Model 848 is consistently mixing 3 cubic yards per minute of loose material on this job, not only speeding up construction, but meeting rigid Navy inspection.

Its ability to handle any bituminous or stabilizing job, in either Travel or Central Plant operation, its portability, high capacity, and thoroughly earned reputation for accurate proportioning and thorough mixing deserve your investigation. The B-G Mixer Book explains and illustrates its many outstanding features. Write for your copy. There is no obligation.

40-14

BARBER GREENE
AURORA ILLINOIS

Repair Services Aid Highway Maintenance

(*Continued from page 40*)

batteries.

The welding shop includes a Westinghouse gas-engine-driven electric welder mounted on caster wheels for easy moving in the shop, and there are portable welding guards so that the work may be done in any part of the shop without endangering the eyes of other workers. An Airco portable acetylene welder is used in the shop and a second unit is carried in the field mechanic's truck, with parts and other equipment for repairs outside the shop. A 30-ton hand press is installed near the welding shop.

The blacksmith shop in a lean-to just at the end of the shop is fully equipped with a forge, anvil, a Pratt & Whitney hammer, a drill press, a power hack saw and a grinder.

The Repair Garage

The front of the machine and other service shops constitutes the repair garage which is entered through six sets of doors with a 20-foot base and which open in three parts, giving a clear space of 11 feet 6 inches and 12 feet high. It is possible to have twelve pieces of equipment in the shop for overhaul at one time because of the fine layout of the doors and the shop. There are ten pits in the twelve stalls, each heavily boarded over flush with the concrete floor. An overhead traveling crane runs the entire length of the shop with a hand-operated Yale chain block running across the 30-foot span and having a capacity of 3 tons.

Included in the equipment of the repair garage are a brake riveter and a series of well-built machinists' benches down the center of the shop with heavy-duty vises and pipe vises. There are plenty of acid-and-soda fire extinguishers at convenient locations throughout the shop for safety.

Outside Services

An L-shaped building opposite the main garage and office building contains the idle equipment, including the 25 per cent of passenger car equipment which was ordered laid up as soon as it was apparent that there would be no new tires for the duration. Then there is the paint shop with a large exhaust fan, a stall for cleaning passenger cars, and an outside concrete platform for the washing of heavy equipment with the various solvents used in the Kerrick Kleaner unit. At the opposite end is an air-on-oil lift for raising equipment for minor repairs and greasing instead of using the pits.

Snow Equipment

San Bernardino is on the edge of the mountains where California has its real heavy snow storms. These can be handled only by the heaviest of equipment which has to stand the hardest service and usage. The District has seven Snogo rotary plows which are maintained at the shops. One of the mechanics said, "We may have a 6-inch snowfall in the mountains and it will produce 25-foot drifts." He knew because he had been out in the field mechanic's car to repair one of the Snogos when it reported by its short-wave two-way radio that it had broken its drive shaft and was buried in a 40-foot drift. They managed to do the repair job after tunneling to the machine, and the Snogo dug itself out.

One of the repair jobs that have to be done frequently is the building up of the edges of the augers that gather the snow at the front of the machines. When these are allowed to run on the ground to remove the snow right down to the surface of the road, the edges wear badly. One method of repair was to spot-weld hard spring wire on the edge of the auger to take the wear. A better and easier method of overcoming this is now used. A section of old grader blade is welded at the base of the auger shield to do the scraping and preventing the auger itself from running on the pavement.

Because of the height of the drifts encountered and the fact that the augers of the Snogos cut only to a height of 5 feet, some are equipped with "back-scratchers", long arms with rotary blades which can be used to knock down, or better cut down, the snow up to the limit of the arms which is about 20 feet from the ground.

Never have proper lubrication and care of equipment been so important. We suggest you follow our series of articles on equipment care, to keep your machines working for Victory.

MARTIN TRAILER

—4 models—

7, 10, 15 & 18½-ton capacities

Don't say, "We want a TRAILER." Say: "We want a MARTIN Trailer."—This will insure your getting a trailer that's EASY LOADING, POWERFUL, FAST, SAFE, LONG-WEARING and ECONOMICAL. . . . .

Sold by all Caterpillar Distributors. WRITE FOR BOOKLET

Martin Machine Company, Kewanee, Ill.

CP Sinkers Can take it—

JUST GIVE THEM ORDINARY CARE

FEW hand-held drills are as well designed, as ruggedly built as CP Sinker Drills. You don't have to handle them with kid gloves or baby them on the job. But, you do have to give them reasonable care, and a few simple suggestions — like the four illustrated on this page — will help you to get maximum service from your CP-32, CP-42 and CP-10 Sinker Drills. Additional suggestions for the better maintenance of CP Sinker Drills will appear in future advertisements. Watch for them.

HOW TO GET MAXIMUM SERVICE FROM YOUR CP SINKER DRILLS

1 Remove, clean air inlet screen every two weeks —more frequently if hose is old. Drill will lose power, if the air inlet screen becomes clogged.

2 Fill reservoir with good grade of oil of proper viscosity for weather conditions. If machine is used constantly, fill the reservoir every hour.

3 Before putting sinker drill in service, always connect the air hose and make sure oil is coming through the machine and out of the exhaust.

4 Blow air hose, connect to machine, turn on air and examine drill shank to see whether oil is going through working parts of the machine.

PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York, N.Y.

AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Compressors, Tools And Hose Need Care

(*Continued from page 25*)

ticles chipped from the drill steel are pounded back into the shank end and also into the striking face of the piston, this being harmful to both.

A little warning on possible troubles with water in wet drilling is not out of place. When the hole in the drill steel is not large enough, or is off center, the end of the water tube is frequently damaged and then the water will run out of the chuck instead of going on down through the drill steel. The same thing happens when the water tubes are cut off too short. Care should be taken in regulating the pressure of the water used in drilling, so that the water pressure is always lower than the air pressure at the face, otherwise water will get into the drill, greatly reducing its efficiency.

A properly formed drill bit gives the correct cutting clearance at the sides. This insures that only the reaming edges of the bit are in touch with the sides of the hole. When the bit, from wear or from improper sharpening, loses gage, it will no longer be free in the hole and the blows of the hammer will wedge it tightly, greatly slowing up, if not entirely stopping, drilling progress.

When the bit stops drilling or slows up, due to losing its gage or from becoming very dull, then the whole shock of the hammer blows must be absorbed by the drill steel and the drilling machine, particularly the piston. This will result in breakage of drill parts and the drill steel itself. Dull drill steel is costly because you get poor results in drilling progress and you damage your machine.

Small Tools

The care of small hand tools operated by pneumatic power should follow very much the same precautions listed for heavy drills. The housing bolts must be kept tight or poor performance will result with damage to the working mechanism.

About the severest treatment that can be given a pneumatic grinder is dragging the tool along the floor. This may result in bending the trigger, the drive shaft, breaking the grinding wheel, or damaging the housing. When moving a tool of this type from one place to another, always drape the hose over your shoulder to prevent putting excessive strain on the coupling to the tool. And don't forget proper lubrication.

Pipe Lines and Hose

Too much stress cannot be laid on the need for blowing out an air hose before connecting it up to a hand tool or a drill. Do this every time when a connection is to be made to be sure that all foreign matter is blown out of the hose into the air and not into the tool or drill. At the same time, be sure that all dirt is removed from a thread or coupling so that it will not be carried into the tool.

The care of air hose is an important, and patriotic, item these days, with rubber one of our most critical materials. Simple rules for the care of various types of hose, including compressed-air hose, will be found in an article on pages 2 and 31 of CONTRACTORS AND ENGINEERS MONTHLY for July, 1942.

Be sure that the hose to every drill has a shut-off valve so that the driller will not be tempted to kink the hose to shut off the air. The practice of kinking the hose to shut off the air results in breaking down the inner tube of the hose, meaning early failure and also causing rubber trash to get into the air tool, stopping it and making it necessary to disassemble it, clean and reassemble it again.

Watch the Air Compressor

Before starting up a new portable air compressor for the first time, read the manufacturer's instruction booklet carefully and follow the instructions, particularly those referring to the lubricating-oil recommendation for the temperature prevailing at the time the compressor is first placed in operation. As in the case of any piece of machinery, the service life of a portable air compressor depends a great deal on the first hours of operation.

One manufacturer suggests a daily routine check as follows:

(Before Starting)

1. Check the oil level in both compressor and engine crankcases. Replenish if necessary.
2. Turn down all grease cups which require daily attention.
3. See that the radiator is full, adding clean water if necessary.

(After Starting)

4. Open intercooler drain valve and blow out condensate. (Twice daily.)
5. Open receiver drain valve and blow out condensate. (Twice daily.)
6. Test intercooler and discharge-line safety valves by hand to be sure that they are working properly.
7. Note oil pressure gages to be sure that oil pumps are functioning.

All portable-compressor manufacturers recommend certain periodic oil changes for both compressor and engine units. Be sure to follow these recommendations. In case the unit is not equipped with an hour meter, or a careful record of operating hours is not available, over-estimate rather than under-estimate the hours the unit has been in operation since the last oil change. Lubricating oil is far less expensive than a major overhaul job. When changing oil, check all the accessory items such as fan belts, air cleaners, etc.

In freezing weather, add anti-freeze to the radiator or drain the cooling system. The capacities of the cooling systems of the various makes of compressors are given in the manuals accompanying the machines. Consult the density tables furnished by manufacturers of anti-freeze for the amount desired. Also in freezing weather see that the battery is fully charged as a battery freezes between 20 degrees above zero and 50 degrees below zero, depending on the state of charge.

Another manufacturer furnishes a list of "Don'ts" which are well worth keeping in mind:

Don't tamper with the pilot valve or throttle control valve. Read and follow the instructions supplied with the compressor. Unloading troubles are not al-

(*Concluded on next page*)

USE RIGHT BUCKET FOR THE JOB

Hayward makes all four — clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.

HAYCO

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

War Projects Accelerated with

PMCO **WELDED DIPPERS**

LIMA SHOVEL
No. 1001 with 2½ yard
PMCO WELDED DIPPER
speeding construction at Lambert Field, St. Louis, Missouri.

Welded construction of PMCO dippers eliminates unnecessary weight that gives added daily output to shovels up to 30 per cent. The welded dipper is a reinforced dipper of unusual strength that keeps going under all conditions to speed war projects.

We operate the largest and most complete manganese steel foundry in the United States.

PETTIBONE MULLIKEN CORPORATION
Established 1880
4710 West Division Street, Chicago, Illinois

Lack of Care Costly; Guard Your Equipment

(*Continued from preceding page*)

ways due to the pilot valve or throttle control valve.

Don't operate at above the maximum pressure for which the unit is rated.

Don't break the seal on the engine governor.

Don't use wet or dirty receptacles for handling gasoline or oil.

Don't operate the machine without efficient air cleaners on both the compressor and engine.

Don't tow the machine faster than the speed recommended by the manufacturer, especially when the compressor is equipped with steel wheels. Slower speeds lengthen life.

Don't operate the engine longer than necessary with the clutch disengaged; better engage the clutch and open the receiver valves for the warm-up period.

Don't operate the compressor at a pressure exceeding the maximum working pressure as shown on the manufacturer's nameplate attached to the frame.

Helpful Literature

Among the available free literature published to assist users of pneumatic equipment to maintain it in operation with a minimum of replacements are the following: "Driller's Handbook" and "Cleveland Cartoons", on the care of drills and drill steel, published by the Cleveland Rock Drill Co., Cleveland, Ohio; "Striking Face Failures of Tappets and Piston Hammers" available from Gardner-Denver Co., Quincy, Ill.; "Conserve Compressed Air Tools", a series of charts published by *Mill & Factory*, dealing especially with the smaller hand tools; "Operators and Maintenance Manuals" published by Schramm, Inc., West Chester, Pa.; and "Do's and Don'ts" wall charts on rock drills and air compressors issued by Sullivan Machinery Co., Michigan City, Ind.

The service and field engineers of the companies mentioned above, as well as of Independent Pneumatic Tool Co., have made valuable suggestions in the preparation of this article.

FBI Asks Every Citizen To Aid Against Sabotage

Increasingly during 1943, every American citizen, no matter where he is located, must consider himself an individual "listening post" for the Federal Bureau of Investigation, because of a new crop of rigorously trained Nazi saboteurs who will soon be graduated from Berlin's crack school for sabotage and loosed upon the world, according to a recent statement. Unless Americans give this help, OWI warns that the FBI cannot guarantee to maintain its present remarkable record of no single successful foreign-directed act of sabotage in this war. However, it was pointed out that the need for citizen cooperation has never been greater than at this time when scores of German saboteurs will be sent to all parts of the world to obstruct the war effort of the United Nations. Some of these agents will inevitably try to enter the United States, and we must therefore be on our guard, J. Edgar Hoover has stated.

The FBI emphasizes three points in citizen cooperation. First, no bit of information however incomplete is unimportant. It may be just the missing piece to the almost completed puzzle. Secondly, don't fail to turn in an item because you think someone else may do so. Thirdly, no report is too insignificant to be considered by the FBI. Although many reports received by the FBI are unfounded, FBI men prefer to have too many reports rather than too few, even though it means extra work for them.

Early this year, President Roosevelt requested all patriotic citizens to cooperate actively with the FBI. Now the FBI is requesting a vigilant continuation of the active cooperation in its work, and guarantees these two things: that citizens never need feel that they are "wasting the time of important men" in bringing in or phoning reports; and that whatever they disclose to the FBI will remain completely confidential between the individual and the Bureau.

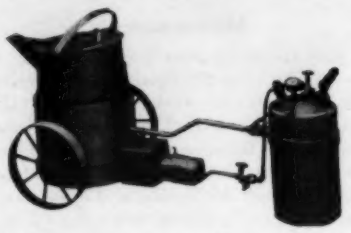
New Cooper-Bessemer Pres.

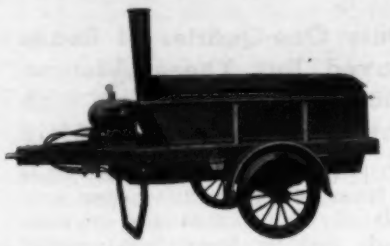
Announcement has been made by The Cooper-Bessemer Corp., Mount Vernon, Ohio, and Grove City, Pa., of the election of Gordon Lefebvre to the office of President and General Manager to succeed B. B. Williams, who will remain active in the corporation and continue his duties as Chairman of the Board.

Mr. Lefebvre, who joined the Cooper-Bessemer Corp. 19 months ago, has been serving as Vice President and General Manager.

For speedy heating of tar and asphalt—

Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.





Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

Connery Construction Co.

2nd and Luzerne Streets — Philadelphia, Pa.

MARION'S FIRST INTEREST IS TO WIN THIS WAR

What the Bill of Rights means to our fighting men is summed up in recent victories in every theatre of war. What it means to MARION is reflected in the continuous stream of Marion machines rolling off the assembly lines — the ever-increasing production schedules—the extra speed, stamina and dependability Marion engineers are building into these machines — the remarkable records of performance wherever they are employed. This is Marion's answer to those who would destroy our Bill of Rights — Marion's way of helping to win the war as quickly as possible.

THE MARION STEAM SHOVEL CO., Marion, Ohio

MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PORTAL CRANES • WALKERS

WORKING FOR VICTORY: DIGGING — Coal • Magnesium • Iron Ore • Copper Ore • Bauxite • Manganese • Nickel Molybdenum • Sand and Gravel • Clay. MATERIAL HANDLING — Shipbuilding and Cargo Loading. BUILDING — Airports • Ordnance Plants • Army Camps • Marine Bases, etc.

Asphalt Pavements In Bexar County, Tex.

Only One-Quarter of Roads Paved But These Assume Increased Importance with Intensified War Traffic

✦ OF the 370.44 miles of paved roads in Bexar County (the "x" is silent as in Mehico), Texas, 329.84 miles are main roads used for heavy farm-to-market traffic and as arterial highways for Army traffic due to the number of Air Corps training fields in the vicinity, the balance being paved streets in subdivisions. The state was building an important military loop connecting certain military establishments around San Antonio, but its completion must be deferred and only those sections considered essential to the war effort are being completed. Until the entire loop is finished, the county roads are the main connecting links. Because of this, maintenance has assumed increased importance in the face of the second asphalt freezing order. When a pavement fails, it means a pothole which is distinctly damaging to a rubber tire and to its owner's feelings. Gravel roads poorly maintained do not develop potholes to the same damaging degree, so blade shortage is not really as serious as asphalt shortage, as the latter curtails patching.

War activities, including the extension of air fields, have closed approximately 30 miles of Bexar County roads while about 39 miles of county roads have been designated as access roads for the various aviation centers. A responsibility that has come to rest on the shoulders of county officials as a result of the war road construction is the acquisition of about 50 miles of right-of-way for widening existing highways for the state or for new location. The county has an area of 1,297 square miles.

County Highway Mileage

Within its borders Bexar County has 1,930.44 miles of state and county highways, of which the county system consists of 1,748.35 miles. The types of roads in the county are distributed as follows:

Paved (no concrete, but various types of rock asphalt, single and double bituminous surface treatments, and asphaltic concrete)	370.44 miles
Gravel (there is plenty of gravel in the county with no haul of more than 10 miles required to place it on a road)	736.86 miles
Dirt (graded, except for about 40 miles yet to be graded in subdivisions where there has been no construction, and hence no work on the roads by the county)	641.05 miles

Organization

County highway work is under the jurisdiction of a Commissioners Court composed of the County Judge and four elected commissioners, one from each precinct, elected for concurrent terms of two years. The Commissioners Court appoints the County Highway Engineer for two years with a contract under usual procedure. The present incumbent, W. F. Pickard, has been with the County Highway Department for five years and has been the engineer since March, 1942, when his two superiors were called into the Army.

Each commissioner buys the equipment for his precinct from his one-quarter of the total County Road and Bridge Fund, but all purchases are passed upon by the entire court. The precincts vary in size as to road mileage as follows:

Precinct 1	563.23 miles
Precinct 2	439.76 miles
Precinct 3	391.87 miles
Precinct 4	353.49 miles

Each precinct owns two power graders and one tractor and pulled grader, while Precinct 3 has eight trucks and the other precincts hire trucks as needed beyond the three dump trucks owned by Precinct 2, four owned by Precinct 1, and the five owned by Precinct 4.

Maintenance

Spot patching continues every day of the year to keep the roads from raveling. All precincts use rock asphalt for this purpose, with a flux to make it more workable. When money and materials are available, the older roads, built from 1920 through 1925, about 17 feet wide and with no shoulders, are widened as a maintenance operation by extending the base to 24 feet and the pavement to 20 feet, using rock asphalt for the pavement widening. On these roads there is no room for more than a 2-foot shoulder on either side. In this work the pavements are leveled as much as possible and the old high crowns taken out.

A seal of 0.25 gallon of OA-135 is applied and covered with 1 cubic yard of ½-inch to 10-mesh hard crushed limestone per 125 square yards, using this slightly heavy application of stone to take care of irregularities in the application of asphalt which is purchased applied by the producer. This treatment has an average life of five years on the lighter traffic roads and two to three years on the heavier traffic roads.

Construction

The methods used for the construction of the existing county roads are of interest, although this type of work is "out" for the duration. About one-eighth of the county is irrigated land so that when new construction is undertaken the gravel for the base is selected with great care to see that it has a plasticity index less than 12 because of the reduction in stability of the subgrade by moisture seeping in from the adjacent ditches.

The most prevalent type of pavement in Bexar County is the single asphaltic surface treatment followed by the D.B.S.T., or double bituminous surface treatment. For the single treatment, the roadway is graded for the full 24 feet with a 2½-inch crown, using either a caliche gravel or a clay gravel with a plasticity index of less than 12. This is sprinkled and rolled by a 10-ton 3-wheel roller and shaped by a power grader until firmly compacted. The base is cleaned of all loose material by a rotary brood ahead of the prime.

The prime is applied to 1 foot outside the paved way at 0.2 gallon per square yard, using MC-1, or if the subgrade is rather open in character as much as 0.25 gallon is used. This is allowed to cure for a period of 48 hours with traffic using it after it ceases to pick up under the wheels of vehicles. In very hot weather the cure is effected in about 24 hours while as much as 7 days is required in cold weather.

If the cured prime has had considerable dirt carried onto it by traffic, the rotary broom is used to clean it or it is spot-cleaned by hand brooms. The treatment thus far is for either the regular surface treatment or for resurfacing with rock asphalt.

For the single surface treatment the surface is then shot with 0.4 gallon of hot OA-135 and covered with the ¾-inch to 10-mesh hard limestone at the rate of one cubic yard per 90 square yards. This is spread by hand or by spreader box. The stone is dragged by steel brooms mounted on a heavy frame and the dragging repeated until all the aggregate is uniformly distributed. The surface is then rolled by a 5-ton 3-wheel roller to key in the stone, and the dragging and brooming continued for a second and third day for best results. This completes the single surface treatment.

The D.B.S.T. is the same in principle except that the stone for the first application is graded from ⅝-inch to 10-mesh. For the D.B.S.T. only 0.25 gallon is used for the first application of the OA-135 and there is no rebrooming of the first application of stone as the second application is made the same day as the first. The second shot of asphalt is 0.35 gallon of the same asphalt, covered at once with 1 cubic yard of ⅜-inch to 20-mesh stone per 150 square yards. This is dragged and rolled the same as the first application and is rebroomed and rerolled for two successive days.

The two other pavings used are rock asphalt in a ½-inch layer on the same prime as for the single asphalt surface treatment, and asphaltic concrete purchased from local commercial plants.

WILLIAMS Buckets
LONGER WEAR, LESS MAINTENANCE COST
because of
WELDED
ROLLED STEEL CONSTRUCTION
• Williams Welded Design means greater strength and eliminates unprofitable "dead" weight.
MULTIPLE ROPE and POWER ARM TYPES • DRAGLINE • POWER WHEEL • DREDGING • STEEL MILL BUCKETS ⅜ to 16½ yd. capacities.
Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why YOUR NEXT BUCKET SHOULD BE A WILLIAMS.
THE WELLMAN ENGINEERING COMPANY
7012 Central Avenue . Cleveland, Ohio

ARMY E NAVY
BUILT BY WELLMAN

You Don't NEED a CARSCOOP IF YOUR LABOR RATE IS $1.00 PER DAY!

Maneuvering within the narrow confines of a boxcar is no trick for the Carscoop, with its 6½ foot turning radius. A single machine will unload 300 bbls. of bulk cement in an hour and a quarter.

But usually the unloading crew must be paid a little more than that these days—provided men are to be had at all! So call on the Butler Carscoop to solve your handling problems—it specializes in jobs that "can't be done." Designed for unloading bulk materials from boxcars, this machine will handle dried clay or lead concentrates, bulk cement or brass bars, with equal ease. Ask for full information today.

BUTLER BIN COMPANY
WAUKESHA • WISCONSIN

Courtesy, General Cable Co.

Wartime Measures For Utah Bridges

A personal interview with engineers of the Utah State Road Commission revealed several straight-from-the-shoulder steps which have been taken to insure continuation of essential bridge construction and maintenance in wartime. An unusual situation exists in Utah, where some local steel is available, but the use of which is forbidden, while timber is very difficult to secure for bridge purposes.

The initial step taken to conserve steel was raising the allowable tensile stress in reinforcing steel from 18,000 to 20,000 pounds, and all reinforcing steel has been eliminated from minor structures wherever possible. Reinforced-concrete culverts have been eliminated entirely by using mass concrete abutments, paving the floor of the structure with unreinforced concrete, while the deck of such structures is made up of 2-inch laminations on which a waterproofing and wearing surface are placed, the later about 1 inch thick.

Two overpasses on the strategic network that were designed as steel I-beam structures were changed to continuous T-beam concrete structures, in order to conserve steel. Another reinforced-concrete structure with a 30-foot span was redesigned to include mass concrete abutments and a timber superstructure. On two other railroad-highway grade-separation structures, one being an overhead and the other an underpass and both located on access roads, timber construction was used throughout.

One of the difficulties encountered in the mining areas of Utah is the increased use of obsolete structures by more heavily loaded trucks hauling ores of great value to the Victory effort. One steel structure of 650-foot span built over an important river for highway purposes in 1910 is designated as on an access road and carries an A-1-a rating. The reconstruction will increase the carrying capacity from its present 8 tons to a standard AASHO H-15 loading. It is already carrying 50-ton loads, over the protests of highway engineers. The trusses are equal to the heavier loads but the floor system is greatly in need of strengthening.

For repairs to heavily loaded bridges on the strategic network, the Utah State Road Commission ordered 240,000 feet of native lumber, but received only 10 per cent, to carry on this vital program. Due to the difficulty of obtaining pressure-treated Coast Region Douglas fir, the Department is treating the native lumber with Osmo-Salts which will increase the normal life of this timber many years.

Concrete and Aggregates Report Discusses Tests

The significance of tests of concrete and concrete aggregates is discussed in the 1943 Report on this subject published under the sponsorship of the A.S.T.M. Committee C-9 with the cooperation of some twenty-five leading authorities. This Report is devoted to the significance, limitations, and applicability of the tests standardized by the Society, of some tests not yet standardized, and a number of tests of a research nature not amenable to standardization. In addition to the various tests for concrete and for aggregates, the book contains a general discussion on "The Numbers of Specimens or Tests of Concrete and Concrete Aggregates Required for Reasonable Accuracy of the Average", by R. W. Crum and H. W. Leavitt. The committee in charge, which correlated the work and arranged it for approval by Committee C-9, was headed by Mr. Crum, serving with Stanton Walker and A. T. Goldbeck.

Copies of this 175-page report in heavy paper binding may be obtained by interested contractors and engineers direct from the American Society for Testing Materials, 260 So. Broad St., Philadelphia, Penna. Price: $1.50 per copy.

Arc Welding News Available

Vol. II, No. 1 issue of the Hobart Arc Welding News is off the press and available free to interested readers of CONTRACTORS AND ENGINEERS MONTHLY. In addition to interesting job stories about the use of welding for a variety of services, including how a snow bucket was made from 100 per cent salvage material, there is information on the "Weld & Tell" monthly competition for unusual and interesting uses of welding.

Copies of this issue of Hobart Arc Welding News may be secured by writing direct to Hobart Bros. Co., Box CE-43, Troy, Ohio.

VIBER COMPANY CONCRETE
VIBRATION

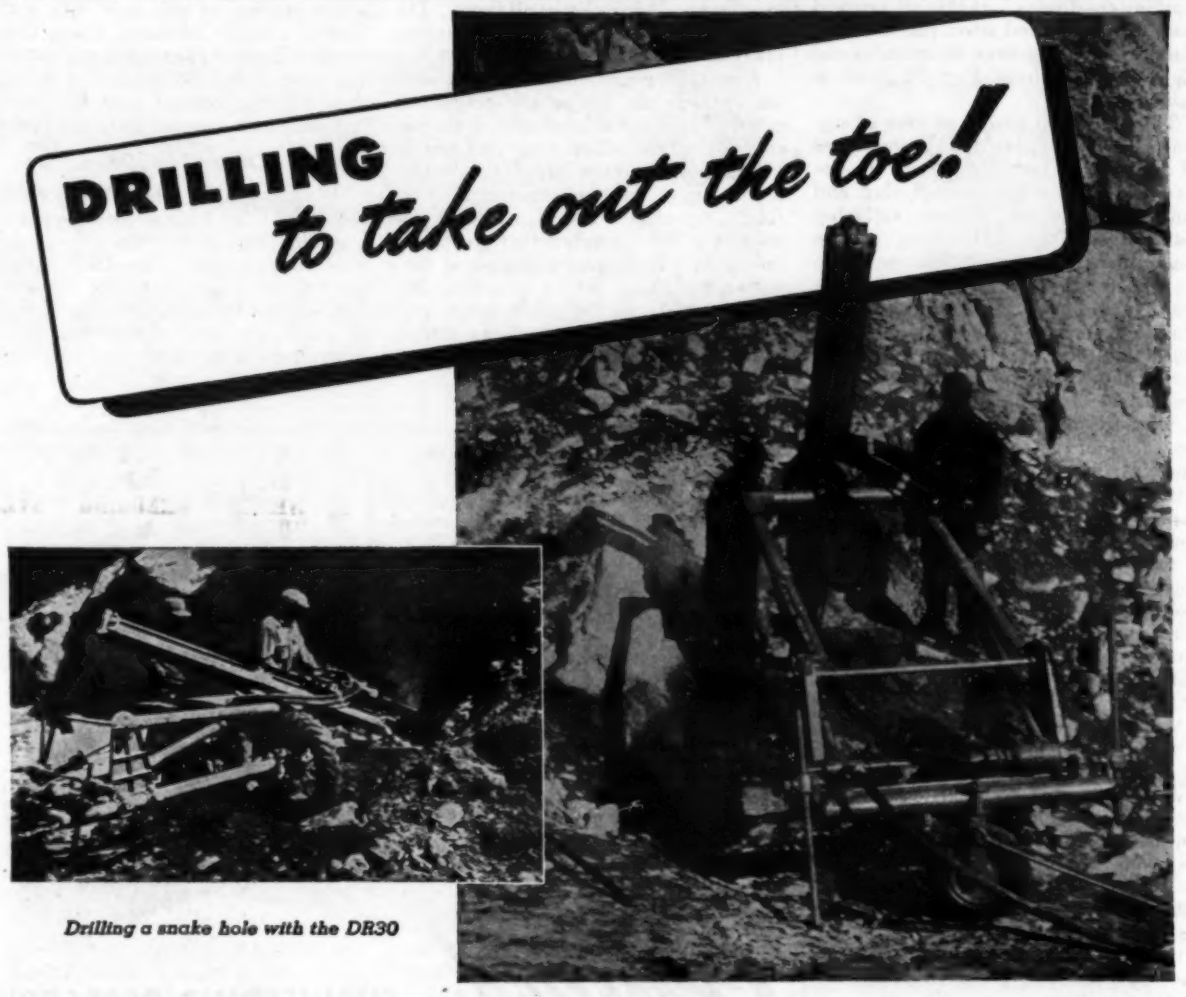
MOST PROFITABLE FOR
REINFORCED CONCRETE BUILDING CONSTRUCTION

When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders, thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . In a word, for all concrete with large aggregate and low water-cement ratio.

Write for complete VIBER data TODAY!

VIBER COMPANY
726 So. Flower
BURBANK, CALIF.

DRILLING *to take out the toe!*



Drilling a snake hole with the DR30

CLEVELAND DR30 Wagon Drills, in addition to having plenty of speed and stamina, are also remarkably maneuverable. They drill readily in any position and at any angle—straight down, flat, breast high, higher than your head, or within 4″ of ground level—even straight up when necessary.

The DR30 has a recoil device to increase cutting speed. The forward leg point steadies the drill. Other important features include a handy centralizer to keep the steel from "walking" while starting a hole. Also a double-screw jack for moving the U-bar. With a feed capacity of more than 8 feet, the DR30 handles depths to 25 feet and more.

Bulletin 132, sent upon request, explains why the DR30 is the most popular wagon drill ever built.

BRANCH OFFICES

Birmingham, Ala. Berkeley, Calif. Boston, Mass. Buffalo, N. Y. Butte, Mont. Chicago, Ill. Cincinnati, Ohio Dallas, Texas Denver, Colo. Detroit, Mich. El Paso, Texas Ironwood, Mich. Knoxville, Tenn. Lexington, Ky. Los Angeles, Calif. Milwaukee, Wis. New York, N. Y. Philadelphia, Pa. Pittsburgh, Pa. Richmond, Va. Salt Lake City, Utah St. Louis, Mo. Victor, Colo. Wallace, Idaho Washington, D. C.

CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 858 Hornby Street, Vancouver, B. C.
Whitehall Machine & Tools, Ltd., Galt, Ontario

BUY U. S. WAR BONDS AND STAMPS

THE CLEVELAND ROCK DRILL COMPANY
Subsidiary of The Cleveland Pneumatic Tool Company
CABLE ADDRESS: "ROCKDRILL" • CLEVELAND, OHIO
LEADERS IN DRILLING EQUIPMENT

Convoys of Army trucks roll over the freshly graveled surface of the Alcan Highway near Fort Nelson.

Alcan Highway

(*Continued from page* 19)

crushed rock an hour despite difficult working conditions. At this pit, crushed rock and gravel and select pit-run material for surfacing over 40 miles of the highway north from Fort St. John is being produced.

This gravel pit covers an area of several acres and yields two distinct types of desirable surfacing material. In one pit area, a good mixture of clay and sand is suitable for highway surfacing without washing or crushing and is hauled directly from the borrow pit to the stockpile or highway for immediate use. In another area of the borrow pit, gravel is removed and run through crushers producing the 1 and 2-inch grades of crushed rock to form the wearing surface of the highway.

Southern Minnesota Construction Co. moved in on the southern sector of the Alcan Highway project last July, about a month after the first grading operations were started, and established its crews in a permanent camp consisting of a mess hall, several barracks, warehouses, garage and office, just off the "tote" road, in the tall trees about 37 miles north from Fort St. John. As the equipment, which was shipped by rail from the United States to Dawson Creek, arrived at the Fort St. John base camp, it was forwarded under its own power or by truck to the large borrow pit area 14 miles up the line.

A Pioneer crusher with two Allis-Chalmers power units and a Lippmann crusher with a single Allis-Chalmers power unit were set up at the edge of the borrow pit which lies about 4½ haul miles from the Alcan Highway. The negligible amount of stripping necessary at this pit where the gravel lies a foot or less below the surface was accomplished by tractor-scraper units. In one section of the pit, the contractors placed a Lima ¾-yard shovel and in another area, an American Gopher ½-yard shovel. Thirty-five trucks were pressed into service, hauling the aggregate from the shovels to the crushers and from the crushers to the road and the stockpiles.

In common with all other contractors on the Alcan Highway, during the summer and autumn construction months, Southern Minnesota worked two crews on daily shifts of 11 hours each, providing continuous around-the-clock operations. The men, the shovels, the trucks, the crushers worked continuously day and night, full seven days a week.

No ordinary highway project, the construction of the Alcan Highway has been a highly important military maneuver, planned and directed by the U. S. Army's distinguished Corps of Engineers. Work on the road—dirt moving, grading and graveling—has been accomplished in record time because of the complete cooperation between the Army and the private contractors.

Southern Minnesota's production at the Peace River borrow pit, one of several borrow-pit areas worked by the firm, has kept pace with the demand and during two months the pit yielded 200,000 cubic yards of crushed and graded aggregate. By mid-November, 15,000 cubic yards of 1-inch crushed rock and 9,000 cubic yards of 2-inch crushed rock had been stockpiled, in addition to the quantities already in place on the highway.

At the pit, Warren D. Latham of Albert Lea, Minn., foreman, is in charge of operations.

Equipment Care

As on other Alcan Highway operations, the main thing has been to keep equipment in operation despite punishing working conditions. Strenuous continuous work has given neither men nor machines any practical respite. Because of transportation difficulties which created a very real problem in obtaining parts and replacements for equipment on the job, Foreman Latham and Ralph Studer of Billings, Mont., General Superintendent for Southern Minnesota, have bent every effort to keeping the equipment in good condition at all times. The order of the day has been to prevent breakdowns.

A gasoline pump and grease rack were set up near the pit so the equipment could be fueled and lubricated at the job site without the added wear and loss of time which would result from the 28-mile round trip to the base camp at Fort St. John. Lubrication, of course, plays an important role in preventing wear and each unit is lubricated and greased during each shift or during the off hours. Mechanics are on the job to make regular inspections of the machines and to go into action immediately, making minor repairs right on the spot.

From the standpoint of breakdowns, the most important machines on the job are the power shovels, for without these units in continuous operation, all other work is at a standstill. The most vulnerable part of the shovels is the cable which controls the movement of the boom and dipper and bears so much of the strain of the load.

By now, William Hazlett Upson's fictitious super highway-equipment salesman, Alexander Botts of the Earthworm Tractor Co., has acquainted even the layman with some of the perplexities of the wire-rope problem on the Alcan Highway. Working conditions on the job are as severe as any to which wire rope could be subjected and, as if that weren't enough, the difficulties in obtaining quantities of this item have made it essential that the life of every foot of cable on the job be extended to the limit.

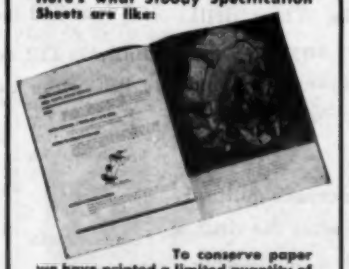
Southern Minnesota has equipped its shovels with preformed wire rope, designed to withstand shock loads and for longer life, and has sought to extend to the fullest the life of the rope by regular inspections, especially for abrasion. Frequent coating of the rope with a thin film of a hardy lubricant, it was found, prevented many abrasives from reaching the rope. Frequent cleaning of the rope itself, at the time of each lubrication, minimized the damage from abrasives.

On to Completion

As operations in general were resumed along the full length of the Alcan Highway this spring, the stockpiles which were created as a result of the continuous winter operations of Southern Minnesota Construction Co. and scores of other gravel producers will enable contractors immediately to resume surfacing the road.

Perfected by ENGINEERING RESEARCH

Here's what Stoody Specification Sheets are like:



To conserve paper we have printed a limited quantity of these Specification Sheets. For this reason, copies are restricted to those concerns engaged on essential projects where wear is a major problem. If you feel that you qualify, write for your copy today.

INTENSIVE effort to complete projects on time has prevented proper maintenance of construction equipment. Spare parts shortage has further aggravated the condition. Development of methods for keeping equipment in operation were forced squarely upon the contractor. Today, Stoody Company offers a compilation of successful methods developed by maintenance welders for combating wear on twenty pieces of earth-working and crawler type equipment. Each method was further developed and perfected by our own engineers and can beyond all doubt be successfully applied to any of the equipment listed.

STOODY COMPANY
1131 WEST SLAUSON AVENUE, WHITTIER, CALIFORNIA

STOODY HARD-FACING ALLOYS
Stop wear . . . Eliminate Repair

THE MOST IMPORTANT UNIT FOR AIRPORT RUNWAY CONSTRUCTION

Wherever there is mixed-in-place construction such as soil-cement, bituminous, etc.

IT DOES THE JOB THOROUGHLY, RAPIDLY, AND ECONOMICALLY

The AGGMIXER operates with other general purpose road equipment—from power take-off shaft of any suitable tractor—easy and safe to operate. The swirling chopping action of the AGGMIXER tines does a thorough job of mixing—wet or dry. Illustrations above show use on airport runway construction. Send for job facts now.

ARIENS COMPANY,
BRILLION, WISCONSIN

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

Enclosed is my remittance of $2 for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name_____

Position_____
(Or Type of Business)

Address_____

(City)_____
N. B., A two dollar bill, check or postage stamps will be entirely acceptable.

State of Washington Enacts New Road Laws

1943 Legislation Insures Funds for Highway Use; Makes Possible Plans For Post-War Road Programs; Changes in County and City Work

+ HIGHWAY legislation passed by the 1943 session of the Washington State Legislature affects materially contractors, counties, and cities as well as the State Highway Department. The high points of the legislation are: 1. It temporarily freezes all revenues from the state gas tax and motor-vehicle license fees for highway purposes, a move which it is anticipated will develop into an anti-diversion amendment when submitted to the vote of the people in 1944; 2. It paves the way for a post-war road-construction program; 3. It increases the autonomy and authority of counties and cities in the expenditure of road funds, and decreases the authority of the State Highway Department over the construction and administration of county roads and city streets; 4. It appropriates from the state's general funds $1,438,299 which represents the balance required for the payment of principal and interest on the remaining outstanding General Obligation bonds of 1933. This act accordingly enriches the motor vehicle fund by 4/10 of 1 cent of the gasoline tax which had been earmarked for the bond sinking fund; 5. An additional $2,100,000 is allotted to counties for road purposes; 6. Five new roads were added to the state's primary system and one road to the state's secondary system.

The highway appropriations, totaling $64,127,522, are divided as follows:

State aid to counties	$16,100,000
State aid to cities	7,500,000
Mine-to-market roads	316,240
Federal-Aid revolving fund	10,000,000
Equipment revolving fund	3,985,500
State highway expenditures	26,225,782

Although State Highway Department funds have heretofore been earmarked for specific purposes, this year $25,444,987 was appropriated in a lump sum, as the Legislature believed that under present conditions it would be inadvisable to restrict the Department's activities, since it is impossible to foresee emergencies resulting from the war.

This lump-sum appropriation paves the way for a post-war road program, as it can be used with the Federal-Aid for preparing plans and specifications for projects to be built after the war. The Washington State Highway Advisory Commission has already submitted to the Governor a list of 59 projects which it believes should be included in a post-war road program.

The legislation in regard to finances and autonomy of the road departments of counties and of city street departments involves a considerable change in policy. Previously that portion of counties' and cities' road funds which was derived from state gas taxes has been spent under the rigid supervision of the State Director of Highways. Under this plan counties and cities spent their own money on their projects and were later reimbursed from state-collected funds, providing the engineering, construction and financing met standards set by the state. Under the new legislation, the money will be paid to each of the subdivisions as it accrues, and they will spend it with no supervision by the state, except that it must be spent on highways or streets.

Other results of the new highway legislation include permission for the Director of Highways to negotiate with contractors for construction and repair of roads when satisfactory prices cannot be obtained by competitive bidding. It also requires the state to pay 75 cents and counties 25 cents of each dollar spent on mine-to-market roads; it authorizes the Director of Highways to cooperate with the Public Roads Administration in constructing and maintaining Flight Strips and certain classes of highways; and it sets up an interim committee and permits employment of a non-resident engineer or firm to study county road requirements and to report on equitable distribution of gas-tax monies to the several counties. The bill appropriates $50,000 from county road funds to pay the expenses of the report, which will be made to the 1945 Legislature.

New Line of Motors

A new line of horizontal parallel-shaft type Gearmotors which meet speed reduction requirements for a wide variety of applications over a range of from 1 to 75 hp has been announced by the Westinghouse Electric & Mfg. Co. These new Gearmotors feature compactness and improved foundation stability through heavy exterior ribbing of the housing at each mounting hole.

The use of adapter castings between motor and mechanical parts allows the use of all standard Westinghouse N.E.M.A. frame motors with each type of unit, and types of motor construction can therefore be readily changed to suit varying service conditions if necessary in the field. The design of the motor-adapter assembly being common between unit types, such assembly can be readily shifted between unit types to meet changes in speed requirements. Many working parts, including gear sets, being common to all three unit types of a given rating, replacement-part programs are held to a minimum.

Gears and pinions in the new Gearmotors are 0.40-0.50 carbon steel, and are given special heat-treatment before hobbing, resulting in tough impact-resisting teeth. Gears and bearings are lubricated by a positive splash system, and new case design allows oil to circulate freely at all times.

Further information on this complete new line of Gearmotors may be secured direct from Dept. 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna.

We should drop the talk—and the psychology—of making sacrifices. In giving every last ounce of our energy, devotion and substance to achieving a speedy, clear-cut and enduring victory we are not making sacrifices but are exercising a proud privilege. We are free men, fighting to preserve our free society against the most barbarous and odious onslaught that has ever afflicted human civilization.—Eric A. Johnston, President, U. S. Chamber of Commerce.

Typical water sludge deposits

Learn to read their warning signs ... save hard-to-get parts

• EXCESSIVE WEAR on valves, pistons, rings, and other internal engine parts is almost always preceded by signs of mechanical trouble or motor oil failure indicated by various types of engine deposits. These signs are not always easy to read—particularly where deposits are caused by a combination of oil and mechanical failures. But time spent analyzing them is well worth while.

Some common types of deposits and probable causes are outlined at the right. When the mechanical causes for these deposits have been eliminated, Standard has two detergent-type, oxidation-resistant oils that will minimize your engine deposit trouble.

Heat-Proofed Stanolube H.D. Developed especially for gasoline and Diesel engines in heavy-duty service where the maximum in oxidation stability is needed to combat high temperature operation ... it eliminates varnish and other deposits caused by oil oxidation. It is also highly detergent, which prevents blow-by carbon and other foreign contaminants in the oil from settling out and clogging oil lines, screens, and filters. This oil is available only to the U. S. Government and fleet operators.

Standard Bus and Truck Oil. This oil combines high oxidation stability and detergency, not found in conventional motor oils, to give exceptionally clean engine operation for practically all normal fleet demands.

Which oil do you need? With one of these oils, you can definitely reduce to a minimum your maintenance time and replacements now caused by engine deposits. Arrange for a trial of either or both. Call the local Standard Oil Company (Indiana) office, or write 910 S. Michigan Ave., Chicago, Ill. In Nebraska, call any local Standard Oil Company of Nebraska office.

Oil is ammunition ... Use it wisely

Common types of engine deposits and probable causes:

Varnish deposits (lacquer-like): a hard, lustrous coating. Forms on many engine parts and is plainly visible on pistons, valves, and bearings. When crankcases are ventilated into the air intake system, deposits from this source may cause carburetion or valve trouble, often mistaken for gasoline gum troubles. Causes: high operating temperatures with low oil consumption, or infrequent drain periods, or poor oil stability against oxidation.

Oxidized oil sludge: a dark, sticky material of a tarry nature. Forms on oil screens, filters, crankcases, etc. Causes: high crankcase temperatures, poor oil oxidation stability, or the extension of drain periods beyond the stability of the oil being used.

Water sludge: a mixture resembling mayonnaise dressing in consistency. Forms in the crankcase and is found in practically all parts of the engine. Causes: excessive water in the oil from leaks in the cooling system, condensation of moisture in the crankcase when temperatures vary widely, or water generated in the cylinders—a product of combustion when gasoline is burned—which may blow by pistons. This deposit or emulsion will form even with the best oils, particularly if dust and other contaminants are present.

Granular carbonaceous deposits: a coating having the general appearance of coffee grounds. Causes: the hardening of oil oxidation products, originally dissolved in the used oil, but later precipitated. The deposit forms more rapidly when there is no detergent agent present to keep the oxidation materials dispersed throughout the oil.

Carbon deposits: vary in type and amount with the type of fuel or motor oil used and the mechanical condition of the engine.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ FLEET CONSERVATION SERVICE

SAND'S-STEVENS
Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8831 Gratiot Ave. Detroit, Mich.

Airports Are Needed At Sea and Abroad

(*Continued from page 2*)

on Current Problems, "Two hundred of these ships of the air could carry from central India to embattled China ten times the cargo that ever moved over the Burma Road in its heyday. And two hundred such planes would be but a small part of the present aircraft production in the United States."

Consolidated Aircraft Corp., creator of the Liberator B-24 4-engine bomber, has graphically portrayed in its recent advertising the tremendous facilities the planes now developed will furnish when civilian traffic can again dominate air transportation. Even today it takes less time to travel from New York to Moscow by plane than from New York to Miami by train. The 11,300-mile, month-long voyage from New York to Chungking, China, by train and ship can be completed by long-range plane via Fairbanks, Alaska, a distance of 7,500 miles, in 38 hours from New York. One of Consolidated's advertisements sums up the future of aviation in these words: "Our growing air power is today becoming a mighty weapon in our hands for Victory. Tomorrow it will be one of the implements with which freedom-loving nations can help build and enforce an enduring peace."

Seadromes

The Seadrome Project of Edward R. Armstrong of Philadelphia, Penna., which was devised and given considerable publicity by Mr. Armstrong several years before the present war, is being revived by an established American airline which is seeking authority for an air route to Europe, using seadromes on the Atlantic. This company, Pennsylvania-Central Airlines, in conjunction with several steel companies, is planning the establishment of three such seadromes, anchored about 800 miles apart, across the Atlantic Ocean.

This system of seadromes will be made up of mile-long floating airports, 70 feet above sea level to clear wave action, and supported by subaqueous pontoons 160 feet below the surface. Each of these floating airports will have hotel and plane-maintenance facilities, and will cost around $10,000,000 each to build. With the required steel released for their construction, it is estimated that these seadromes could be built in about five months.

The Air Free for Trade

If our nation, which is contributing men and munitions to free the world of tyranny, is to realize its full share of air trade in the years to come, it must have available suitable air bases scattered throughout the world for its peacetime air armada of commerce. We have built many military bases in foreign lands, but no arrangements have been made for the use of these bases for peacetime commercial and passenger air traffic, after the cessation of hostilities. Thus, the United States, a non-imperialistic nation, with but few possessions distant from continental North America, may land her planes on other continents only by permission of other nations. Greatest builder of planes, the United States is not a great acquirer of colonies, so her giant fleets of post-war transport planes might have to remain at home.

In time of war, restrictions on the flights of foreign planes are necessary. Turkey was entirely within her rights as a neutral country to forbid Wendell Willkie to fly to Ankara in the converted U. S. Army Liberator bomber "Gulliver." It was a warplane on a peaceful mission, but other nations with equally as friendly representations might well have taken advantage of such a precedent, for ulterior purposes.

When peace returns, commercial planes should have the "freedom of the air", the right to land and take off at any airport, and to fly from any nation to any other. This is in accordance not only with our traditional policy of freedom of the seas but also with the fundamental principles of world unity as stated in the first article of this series on Post-War Planning (C. & E. M., April, 1943, page 4). A United Nations Confederation, or Council of Nations, should police the air, as it should police the military activities of all nations on the ground. Therefore, the air could be free for commerce, to be used by all nations with safety and without fear of aggression.

Freedom of the air should include the privilege for foreign commercial planes to use at all times the regular commercial routes within a country, but should require all planes to conform to international rules for flying safety.

Free Ports of the Air

Why not establish in each nation throughout the world large "Free Ports of the Air" open to the commercial aircraft of all nations? Here landings and take-offs could be made without the hindrance of customs and immigration officials, and warehouses would be available for storage of cargoes awaiting trans-shipment or entry into the country for commerce. These "Free Ports of the Air" would be comparable to the maritime Free Ports which already exist in many parts of the world.

They should be great national airports, as distinguished from local airports owned by municipalities or by private interests. They would be controlled as to traffic, warehousing, etc., by the nation building them, with international policing by the United Nations Confederation to prevent usurping of rights and privileges by any one group or nation. Such Free Ports would serve commerce exclusively, the entry of military aircraft, other than the International Air Patrol, being forbidden except by previous arrangement, as has been the case since international aviation began.

The hangars, warehouses, hotels and service facilities in these National Free Ports would be owned by the nation, and leased to private concerns, just as with such similar facilities in maritime Free Ports.

CAB Survey

A recent survey by the Civil Aeronautics Board to determine the opinions of leading airlines in the United States concerning post-war international aviation has brought out an interesting consensus of opinion. The airlines, in general, feel that the Federal government should establish reciprocal agreements with foreign governments at once covering non-commercial non-military international flights and the right to land for refueling and servicing. This is distinguished from commercial flights for the transportation of passengers and cargo.

Airlines further feel that there should be no restriction on the number of competitive flights or routes of airlines operating between international points. They concur in the need for free zones, a subject which we have discussed under "Free Ports of the Air" above. The need for airports and air bases in all parts of the world, available to American-flag air carriers on a non-exclusive basis, is set forth by the airlines, with the suggestion that these bases be financed by the United States.

The universal development of "Free Ports of the Air" in all countries is the

(*Concluded on next page*)

Heavy War Loads
are kept moving day and night
with Haftrak and Traktrailer
transportation by
LINN
CONTOUR-FOLLOWING TRACTION
The more it carries,
the more it can pull
The LINN MANUFACTURING CORPORATION
MORRIS, N. Y.

"The letter "S" stamped on the back of this wheelbarrow tells me it's a STERLING wheelbarrow. That's my assurance of getting a really high-grade barrow, the kind that can take the punishment of hard everyday wheeling, and come back for more. No wonder buyers have stuck to Sterlings for nearly 40 years."

Buy BONDS for VICTORY

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

RUD-o-MATIC TAGLINE

A FOOL-PROOF TAGLINE

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearing and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

Manufactured by
McCaffrey-Ruddock Tagline Corp.
2121 E. 25th St., Los Angeles

Needed Construction For World Aviation

(*Continued from preceding page*)

complete answer to this problem instead of creating outposts which might readily be considered by smaller countries as potential military bases. Domination, or seeming domination, of any small country by one of the large powerful nations should be shunned as creating suspicion of imperialism. The world must be established on the fundamental platform of international unity and equality in the post-war era. (See C. & E. M., April, 1943, page 4, "International Responsibility").

Construction

The construction of Free Ports of the Air would take on great importance because of their size, their geographic distribution in every nation, and the number that would be required in such great expanses of territory as the United States of America, the United States of Brazil, Dominion of Canada, the Union of Soviet Socialist Republics, the Republic of China, and other nations. The actual size of each Free Port would be controlled somewhat by the expected trans-ocean or transcontinental air traffic, but the size of ship will always be great, thereby necessitating long runways or calm waterways for take-off and landing. Covering an area of 2,500 or more acres with runways, seaplane base, hangars, administration buildings, meteorological station, radio facilities, warehouses, and hotels, each such enterprise would represent a national investment of upwards of $150,000,000 in the future of air-borne trade.

In the United States at least eight such Free Ports might be needed to serve international air transport: three on the Atlantic Coast, in New England, the Middle Atlantic area, and in Florida, for European, African and South American traffic; one on the Gulf and one in Texas for Central and South America; two on the Pacific Coast for the South Pacific and Asia; and one in Minnesota to serve the Great Circle routes to Europe and Asia.

Since air transport can move the smallest and most valuable articles of trade, such as diamonds, securities, etc., with great speed, and at the same time handle bulky freight such as machinery, rubber, quinine and other medicinal products, which are now being flown between the Americas, many cities which formerly grew great on their water-borne commerce may find certain trade transferred to an inland city better equipped to handle it because of its National Free Port of the Air. Thus many foreign countries with much trade in small valuable articles and no available harbors will be thrust to the fore by the construction of adequate inland airports, either as Free Ports of the Air or as regular airports.

As an example, let us take Bolivia, one of the progressive republics of South America, where air transport is already coming to life under war stimulus. Bolivia has stepped directly from the llama to the airplane for transportation within her boundaries. Already a $750,000 modern airport is under construction at Cochabamba by Panagra, with long, modern runways, subterranean fuel storage, radio and meteorological facilities, night lighting and hotel accommodations for air travelers. Other air fields at the capital city of La Paz, Oruro and Santa Cruz, provide internal communications in this landlocked republic of slightly over 500,000 square miles where the extent of high terrain makes all other types of travel difficult and adds to the hazards of aviation. Already the new airport at Cochabamba is a link in air commerce with the outside world. With no harbors, no rivers suitable for deep draft commerce, Bolivia is set for the post-war world in which aviation will play its part in heavy transport. Bounded by Brazil on the north and east, by Paraguay also on the east, by Argentina on the south and by Chile and Peru on the west, "freedom of the air" means much to Bolivia. Her present trade routes are available to her only by treaties with her neighboring nations. The development of air transport to and from Bolivia will draw that country closer to the markets of the world.

Conclusion

We are now fighting a war for freedom. That war will be successfully concluded only if freedom has been gained, not only from oppression and occupation by tyrants, but *for* economic and social expansion and development for all the nations of the world. Unless we realize that the world, now made so small by the development of air transport, can not live in peace and prosperity half slave and half free, the war will have been fought in vain. Freedom of the seas, freedom of trade, freedom of the air, are all essential to winning the peace.

From the concentration of the world's best minds on the problems of war production will emerge many new developments which can and will be adapted to peacetime use. Outstanding among these are the developments in aviation and air transport. These open up vast new possibilities in trade and prosperity—but first must come the construction of the necessary facilities.

Work Resumed on Parts Of California Project

Construction will be resumed on several portions of the Bureau of Reclamation's Central Valley Project in California, according to a recent WPB announcement. The work to be resumed includes the completion of Friant Dam, already more than 90 per cent complete, to provide for the storage and release of water; completion of the partly finished Madera Canal leading from Friant Dam 38 miles north westward to the Chowchilla River area; and continuation of concreting on Keswick Dam which is already under way. These projects, together with other sections of the vast Central Valley Project, were halted late in 1942 because of the critical-materials situation.

While the situation as to critical materials has not changed substantially since the projects were halted, the additional work is being authorized to obtain increased food production which Friant Dam and the Madera Canal will make possible and to facilitate the ultimate completion of Keswick power plant if it should become necessary later.

Award to Universal

Announcement has been made that the Universal Engineering Co., Cedar Rapids, Iowa, was awarded the Army-Navy "E" for excellence in war production.

Write, wire or telephone for further information.

JACKSON ... HYDRAULIC VIBRATORS ARE VERSATILE

. . . they give you what you want. Designed for a wide range of applications, the standard 2¾" diameter head is quickly interchangeable with a grinding head for use where wet rubbing or dry grinding is required. Use of a chuck in place of grinding wheel converts grinder into a drill.

A simple twist of the manual valve and you can have any speed, from idling to 6800 R.P.M. submerged. The JACKSON Hydraulic Vibrator gets things done. Economically! It is an ideal general purpose internal vibrator.

ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON, MICH.

THE PUMP THAT *Stays on the job!*

ON the really *tough* pumping jobs where dirt, sand and grit take rapid toll of ordinary pumps, rugged CARVER centrifugals are setting records for consistent high performance. Long, trouble-free service is a job-tested *fact* about CARVER pumps that will mean dollars and hours saved on *your* job, for these outstanding centrifugals maintain their lightning-fast prime, their extremely high efficiency, even after thousands of hours of pumping.

For a pump that starts out ahead and *stays* ahead—specify CARVER on your job!

•

Gas engine, electric motor or belt-driven CARVER centrifugals are built in capacities from 5,000 to 125,000 G.P.H.

•

Get the *facts* about these efficient, long-lived pumping units — write NOW for your copy of the CARVER pump catalog.

CARVER PUMP CO., Muscatine, Iowa

CARVER CENTRIFUGAL Certified PUMPS

Earth and Rock Dam To Control Floods

(*Continued from page 37*)

hauled the impervious material for spreading on the dam. In addition six 12-yard bottom-dump Euclids were loaded by a Lorain 2-yard shovel and hauled the impervious fill for the dam. Four 23-yard Carryall scrapers hauled the processed material from the stockpiles to the fill and spread it as random fill. When it was necessary to haul rock deficient in the binding materials and place it on the fill, the rock was spread 4 inches thick and immediately covered with 2 inches of earth borrow. The thorough incorporation of these two materials was mentioned earlier in this article.

The Carryall scrapers spread their loads uniformly as indicated by the spotter on the dam, but the bottom-dump trailers left windrows of earth. These were quickly spread by a Caterpillar D7 tractor and LeTourneau bulldozer to give a uniform layer of the earth over the rock for compaction by the sheepsfoot rollers. The bulldozer bladed on the forward trip and coming back in reverse dragged the blade and smoothed out the small remaining windrow.

The compaction of the layers of material was affected by a minimum of six passes of the sheepsfoot rollers over the newly spread material. Two sets of La-Plant-Choate 3-drum sheepsfoot rollers with a specified weight of 550 pounds as required by U.S.E.D. specifications were pulled over the area being compacted by Caterpillar D8 tractors. The formula for weight was as follows: The total weight of the sheepsfoot tamping roller divided by the total area in square inches of the maximum number of tamping feet in one row parallel to the axis of the roller shall be not less than 550 pounds with the roller weighted nor more than 250 pounds with the roller empty.

The character of the mixed processed rock and the random fill from the borrow pits in the valley was very mealy when there was not enough water in the mixture and it would not compact readily. In order to insure rapid compaction with the six passes of the tamping rollers as specified, the compacted layers were wet with water from sprinkler trucks carrying 1,200-gallon and 2,000-gallon Pittsburgh-Des Moines tanks before the next layer was spread and then the uncompacted layer was wet before compacting began. One vertical-shaft well pump was installed on each bank of the river downstream of the dam just below the outlet of the diversion tunnel to furnish water for industrial purposes on each side of the dam site. Storage tanks high up on the banks permitted the maintenance of sufficient pressure to discharge tanks rapidly and thus save time while the pumping rate could be kept uniform and at the maximum efficiency of the pumps. A total of 144,000 gallons of water was needed theoretically each day for the maintenance of the proper moisture content for compacting the layers of fill. In order to be sure of this amount of water, a total of over 200,000 gallons was used to allow for evaporation.

As the job was carried on day and night to insure the completion of the dam to the specified height before the end of November, 1942, the contractors provided large batteries of floodlights on towers on the center line of the dam high up on either bank. In addition, portable units were used to give high-intensity illumination on the areas where the fill was being placed.

Major Quantities

The major quantities involved in the contract for the construction of this large flood-control dam were as follows:

Clearing, grubbing and removal	50 acres
Excavation, in borrow area	770,000 cu. yds.
Selected impervious fill	430,000 cu. yds.
Random fill	1,793,000 cu. yds.
Filter fill	79,000 cu. yds.
Rock fill	791,000 cu. yds.
Rolling fill, for each additional 3 trips	440,000 sq. yds.

The contract was awarded on May 23, 1941, for the bid price of $3,675,265.00 for the earth dam and a concrete-lined spillway. Work was started July 23, 1941, and the completion date for the entire project is April 2, 1945. To meet the request for the completion of the dam to Elevation 1,497 by December 1, 1942, the contractors have been working on a schedule that permits of maximum production, good equipment maintenance and ample time for blasting without shutting down the other operations at odd times. The first shift started work at 5:30 a.m. and came off at 4 p.m. while the second shift started at 5 p.m. and quit at 3:30 a.m. This allowed time for greasing between shifts and during the shutdown period at night, gave the men an 8-hour day at regular wages and the overtime at one and a half pay so that their total income was in line with competing war industries. All blasting was done at 10:45 a.m. during the ½-hour lunch period, and between 4 and 5 p.m. when the shifts were changing.

Personnel

The co-bidders for this project, Hunkin & Conkey Construction Co. of Cleveland, Ohio, and Schofner, Gordon & Hinman of Los Angeles, Calif., are completing it well within the contract time under the direction of the U. S. Engineer Department.

One "Quickie" salvage job isn't enough. We've only just begun to scrap. Keep the scrap moving!

Equipped as a Concrete Surfacer

Placing a Stiff Mix Concrete

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

Operates 8 Tools

Concrete Vibrator, Concrete Surfacer, Form Sander, Wire Brush, Drill, Chain Saw, Circular Saw, Sump Pump

- Places low-water-cement-ratio concrete better, faster
- Eliminates honeycombs and voids
- Assures a stronger bond with reinforcement
- Permits an earlier stripping of forms
- Operates 2⅜" x 19" vibrator
- Variable speeds 1000 to 3000 r.p.m.
- Countershaft speeds 3000 to 7000 r.p.m.

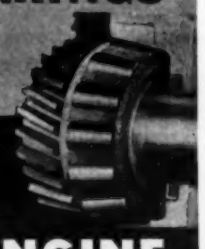
Available on Priority Orders—write for literature and prices

MALL TOOL COMPANY

7743 SOUTH CHICAGO AVE. CHICAGO, ILLINOIS

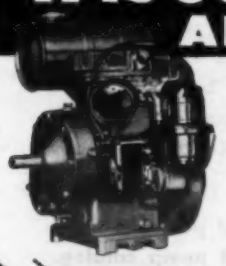
Offices and Distributors in Principal Cities

TIMKEN ROLLER BEARINGS in a SINGLE CYLINDER ENGINE?



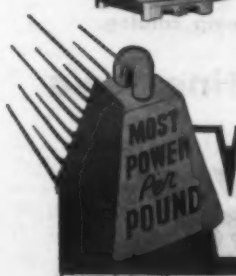
Certainly — if it's a

WISCONSIN AIR-COOLED ENGINE



No Wisconsin Engine, so far as we know, has ever had a case of "Bearing Failure." Basically, this is an end result of using Timken Roller Bearings at both ends of the crankshaft. Normally, small engines are not provided with this safeguard . . . but every Wisconsin Engine, whether single cylinder or 4 Cyl.; 1 hp. or 35 hp., has this heavy-duty service protection.

This is a typical example of Wisconsin Air-Cooled Heavy-Duty Engine design and construction . . . geared to maximum utilization of power-operated equipment.



WISCONSIN MOTOR Corporation

MILWAUKEE, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

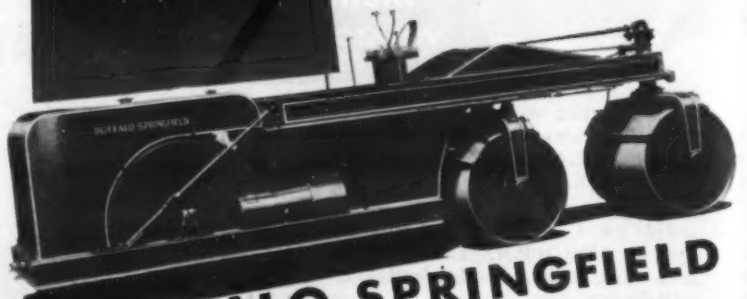
STURDY TROOPERS

There is nothing to match hard-boiled war service to disclose the weaknesses or prove the strength of a piece of machinery.

That the Buffalo-Springfield roller is meeting every test . . . proving itself a good trooper testifies to its inherent soundness of design and rugged construction.

For the duration, in service on five continents and available to military contractors only.

THE BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD, OHIO



BUFFALO-SPRINGFIELD ROLLERS

Pooling Won't Solve Maintenance Problem

(*Continued from page 45*)

governmental agency if this equipment can be kept in satisfactory running condition." Rhode Island said, "The question of replacement of worn-out parts is more vital than swapping or loaning the equipment."

In the report from California it was stated, "Another important point that the War Production Board must squarely face is the need for permitting production of repair parts in sufficient volume so the needed repairs can be accomplished without delays. Every road maintenance agency is confronted with the problem of keeping old equipment going. Hence, larger amounts of repair parts must be available if our road transportation system is to be maintained adequately."

As already indicated in some of the reports quoted above, there is a general feeling that each state can work out its own problems in an informal friendly manner, as has been done in the past, or as is being done now, without complicated set-ups, tons of forms to be filled out and sent to Washington, and miles of red tape to tie up and then untie. The state highway departments are all facing a serious manpower shortage, as are all other organizations and agencies, and they need the men they have to handle the immediate problems of the job at hand. None can spare any of their personnel for elaborate record-keeping jobs such as would doubtless be entailed in a formal equipment-pooling system.

Conclusion

The state highway department engineers of this country are only too ready and willing to cooperate with the Federal Government and the WPB in any way possible. They have collected the citizens' metal and rubber scrap, they have searched their shops and yards for scrap of their own, they are exercising all their imagination and ingenuity to save and salvage, substitute and survive. But the greatest contribution which the highway engineers can make to this country's war effort is to maintain our present transportation system at its highest possible efficiency. This job our highway engineers are doing in the face of tremendous obstacles of manpower shortages, lack of repair parts and critical materials, curtailment of necessary operations, and in many cases with heavier traffic loads traveling over their roads than ever before.

Highway department engineers have met emergencies before. They have solved the problems of blizzards and floods, and the need of extra equipment and men, and they are now meeting the emergencies of loss of trained personnel and the necessity of keeping old equipment on the job. The organizing ability, imagination and ingenuity of the American engineer will continue to solve these problems as they arise.

In an effort to be helpful, the WPB seems to have secured an erroneous picture of the situation: rather than aiding the highway departments of the country, this equipment-pooling plan would only burden overworked engineers still further by necessitating elaborate systems of records and the red tape and formalities which inevitably accompany the processes of democratic governments. The concensus of opinion as expressed to us by 45 state highway departments is that there is no need for such an equipment-pooling plan; that when the need arises each state highway department can solve its own problems in its own way; and that given a few needed repair parts to keep present equipment on the job, the highway departments will "keep 'em rolling" over the highways.

Electronics Control For Equipment Motors

New positive speed control under varying loads with assured prevention of current surges has been announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The new device, the Mot-O-Trol, consists of a team of electronic tubes which tailor the power to a direct-current motor far more accurately than the fastest human hand and brain. Dials set for forward and reverse speeds insure at every reversal an accurate and immediate return to the speed set on the dial. These speeds are infinite in number and cover a speed range as wide as 100 to 1.

The Mot-O-Trol is especially effective for the control of speeds on machine tools and other equipment where an assured constant rate of feed is necessary to prevent breakage but a much faster speed is required on reverse as a time-saver. The control of the speed of conveyor belts where loads constantly vary is an application in the field of construction.

Complete information on the applications of this new control device may be secured direct from Westinghouse by mentioning this item.

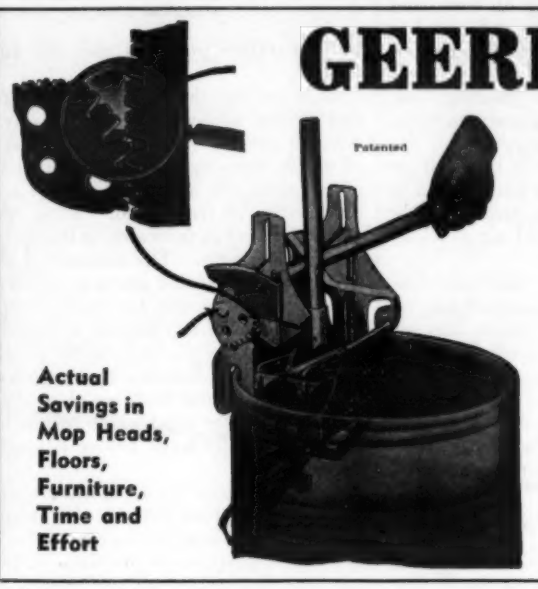
Line of Melting Kettles

The improved line of Hauck melting kettles for tar, asphalt, pitch, and jointing compounds is described and illustrated in Bulletin No. 660 recently issued by the Hauck Mfg. Co., 124-136 Tenth St., Brooklyn, N. Y. Among the models included are the heavy-duty wheel kettles as well as skid-type kettles.

Gar Wood Names Berg Mgr. Road Machinery Div.

Announcement has been made by Gar Wood Industries, Inc., Detroit, Mich., of the appointment of A. C. Berg as Manager of its Road Machinery Division. Mr. Berg, who joined the company in 1919, became Assistant Manager of the Road Machinery Division when it became a part of Gar Wood Industries in 1934. R. S. Headley has been appointed Assistant Manager.

The Gar Wood Road Machinery Division, now engaged 100 per cent in war work, produces hydraulically and cable-operated dirt-moving scrapers, bulldozers, rippers, and tamping rollers for earth-moving projects.



GEERPRES

Mop Wringer

In Service for Total Victory

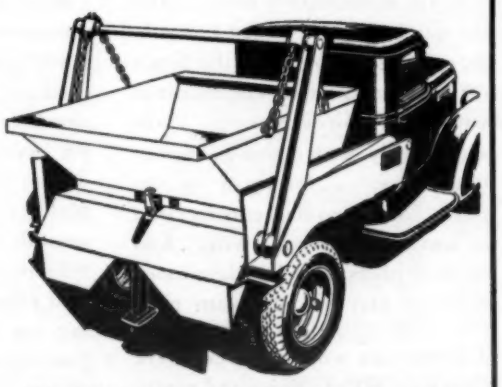
Actual Savings in Mop Heads, Floors, Furniture, Time and Effort

GEERPRES WRINGER INC.

Muskegon, Mich.

First Aid for "Rush" Contracts

Brooks LOAD LUGGER



EASY to mount on any standard truck chassis

HANDY to use with 5 to 10 detachable dump buckets

FAST in action: 15 seconds for hoisting, dumping or spreading

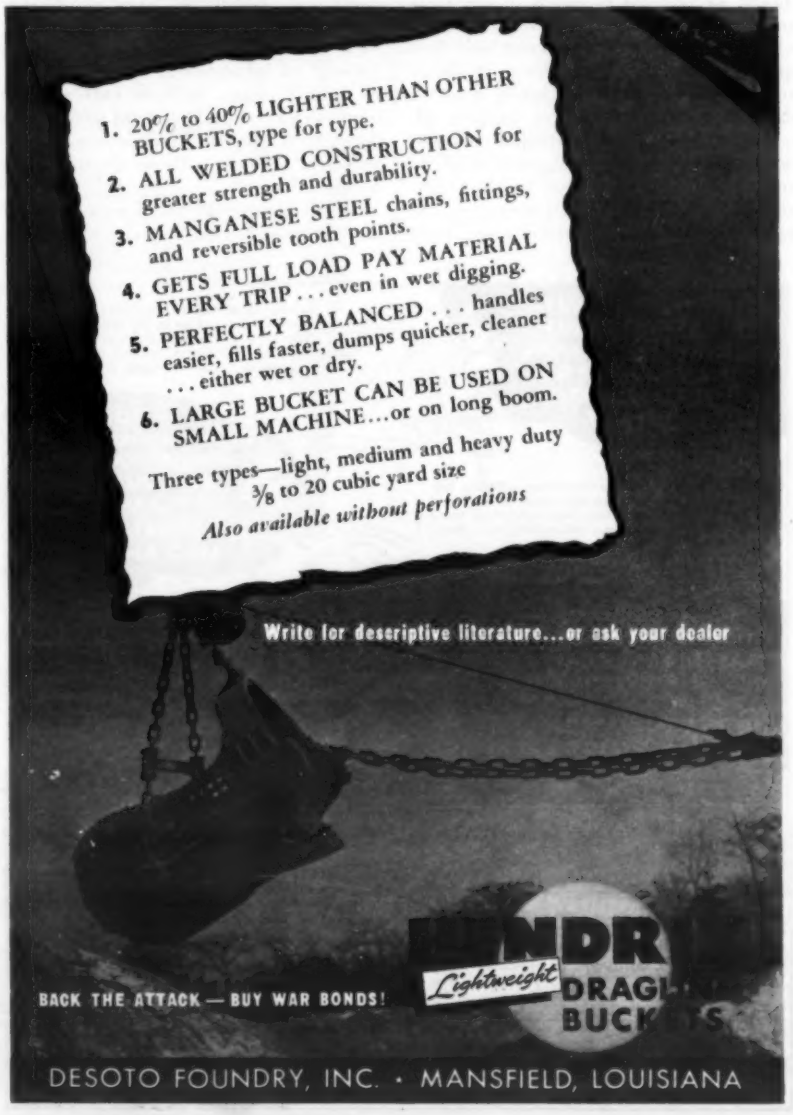
ECONOMICAL to operate and maintain

Save time, men and equipment by using LOAD LUGGERS on your trucks for material moving jobs, wherever loading is done by hand labor. The low height of the buckets makes them easy to fill on the ground. No waiting for trucks to load up . . . buckets are hauled and dumped as fast as filled . . . the work is continuous. The more buckets that you use, the fewer trucks you need. *Write for complete catalog.*

706 Davenport Road, Knoxville, Tenn.
Distributors in all Principal Cities

Brooks EQUIPMENT AND MFG. CO.

Get a load of these features...


1. 20% to 40% LIGHTER THAN OTHER BUCKETS, type for type.
2. ALL WELDED CONSTRUCTION for greater strength and durability.
3. MANGANESE STEEL chains, fittings, and reversible tooth points.
4. GETS FULL LOAD PAY MATERIAL EVERY TRIP . . . even in wet digging.
5. PERFECTLY BALANCED . . . handles easier, fills faster, dumps quicker, cleaner . . . either wet or dry.
6. LARGE BUCKET CAN BE USED ON SMALL MACHINE . . . or on long boom.
Three types—light, medium and heavy duty
3/8 to 20 cubic yard size
Also available without perforations
Write for descriptive literature...or ask your dealer
Lightweight
BACK THE ATTACK — BUY WAR BONDS!

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

Design and Planting Control Snow Drifts

(*Continued from page 30*)

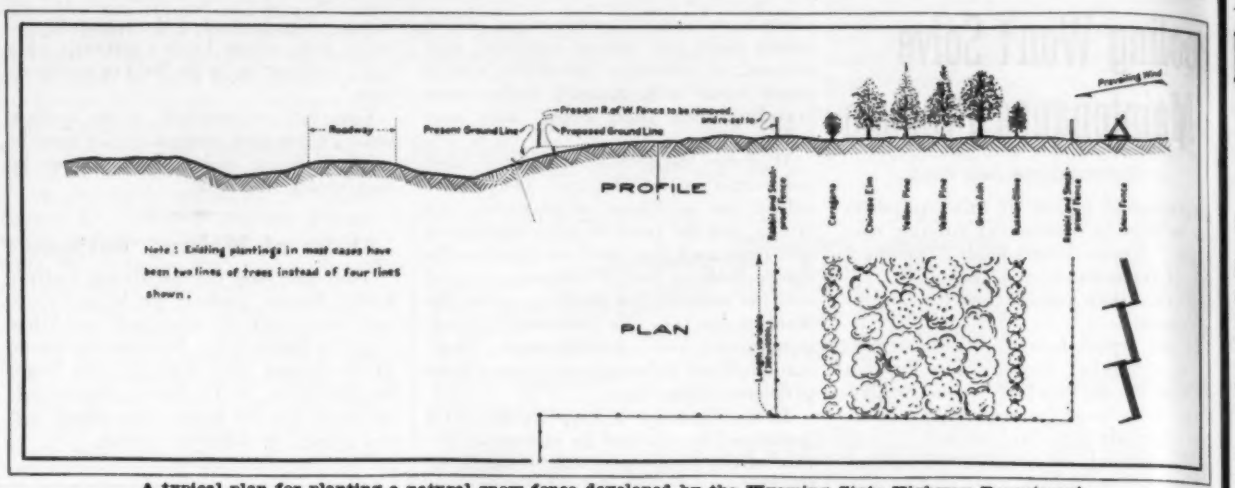
altitudes where irrigation is not available. Wm. H. Earnshaw, former Landscape Engineer, Utah Road Commission, reports that plans were under way prior to the war to carry on some experiments with native tree growth to prevent snow drifts. At present, combination fencing supported by iron posts is used for this purpose and removed from the roadside each spring.

Norman Hill, Maintenance Engineer, Washington Department of Highways, reports that the planting of trees and shrubs to act as natural snow fences has never been undertaken in Washington. Mr. Hill states, "This does not mean that we are averse to such planting, but rather that we have not yet gotten to it. Also, it happens that a large part of the areas within this state where the drifting of snow occurs is arid in nature, and it would be very difficult to grow suitable trees and shrubs that would act as windbreaks."

The streamlining of highway cross sections to prevent the accumulation of snow within the highway section has not been undertaken to any great extent in Washington. The one project of the kind that was attempted was entirely successful, according to Mr. Hill, but was wiped out completely by the construction of a huge airport east of the city of Walla Walla.

Streamlining and Planting

A considerable program of flattening backslopes and fill slopes in South Dakota has been very effective in snow control. According to Charles Rudd, Landscape Engineer for the South Dakota State Highway Commission until he became a Major in the Army, "It was decided that only the most hardy trees should be planted in much of the state and that shrubs should be used only where the rainfall was heaviest, and then sparingly because shrubbery required more maintenance. Originally a lot of shrubbery was used on a project adjacent to or within a municipal corporation where the city obligated itself to maintain the area. This, with a few exceptions, was not satisfactory, so the use of shrubbery was discontinued, both for decorative purposes and for snow control."


Roadway
Present Ground Line
Present R.of W. Fence to be removed, and re-set to
Proposed Ground Line
Prevailing Wind
PROFILE
Note: Existing plantings in most cases have been two lines of trees instead of four lines shown.
PLAN

A typical plan for planting a natural snow fence developed by the Wyoming State Highway Department.

In Wyoming, the first planting of trees and shrubs adjacent to the highway to provide natural snow fences was done about ten years ago. Chinese elm, yellow pines, green ash and Russian olive were the species of trees used. These were placed in rows as indicated in the accompanying diagram. The distance of each row from the traveled roadway is not the same on each project but depends upon the character of the terrain adjacent to the road and the direction of the prevailing wind. It is essential that each location be studied and the trees planted at a distance from the road which will be best for trapping the snow before it reaches the roadway.

Plantings have been confined mostly to the southeastern portion of Wyoming which has the heaviest rainfall. In the dry desert portions of the state, there is not enough moisture for tree growth and plantings for snow control.

Elevation of the roadway surface sufficiently above the adjacent ground to provide a wind-swept grade line and streamlining of the cross section have helped greatly to solve the problem of snow control in Wyoming. The streamlined cross section provides free wind movement across the road, which prevents the deposit of wind-borne snow. The use of 6 to 1 slopes in both cuts and fills tends to prevent the deposit of snow for the reason that the wind sweeps through and over the cuts with no abrupt change in direction.

In discussing the snow-removal problem, Frank Kelso, former Superintendent, Wyoming State Highway Department, stated that the following four factors would contribute to its simplification in the snow-belt states:

1. Location of the road, when feasible, to avoid all areas subject to heavy drifting. Advantage should be taken wherever possible of natural features in the adjacent terrain to secure protection

(*Concluded on next page*)

Bituminous Runways are Quicker to Construct... Cost Less... Last Longer!

The age of aviation is *here* . . . and the quicker business men and public officials realize it . . . the better off their respective communities will be in post-war years! Plans are already under way . . . specifications set . . . for many an airport . . . ready to start construction as soon as Victory is won. And in these plans, *seamless* bituminous runways play an important role.

All over the world, citizens have seen how Allied armies and navies are dotting deserts and jungles, valleys and plateaus with quickly constructed, low cost bituminous landing fields. These resilient bituminous surfaces "take" the full shock of landing huge transports, yet seem to "give" beneath the wheels to "cushion" the landing. Maintenance men believe the smooth black runways are less abrasive, less wearing on tires. And pilots claim they are less glaring on the eyes, easier on the passengers. Get complete details in new *free* booklet — write for *your* copy!

ETNYRE
"Black Topper"
BITUMINOUS DISTRIBUTORS

E. D. ETNYRE & CO., MAIN PLANT AND OFFICE, OREGON, ILLINOIS, U. S. A.

CONTRACTOR SMITH KNEW THAT HIS SELF-PRIMING CENTRIFUGAL PUMPS WOULD GET RID OF A SKAD OF WATER IN A HURRY!
He also knew that a self-priming pump can handle more water for its size than any other pump on a dewatering job. Then again he had seen self-primers do well point work, seepage and handle sand and silt too.
— BUT HE DIDN'T KNOW THAT HE WOULD SOON WEAR THEM OUT TRYING TO PUMP A HIGH PERCENTAGE OF MUD AND SAND
In the smaller sizes of self-primers, difficulty has been experienced by contractors with all makes of pumps on these jobs. Impellers and pump cases have been chewed out long before their time. Seals fail and they take too long to prime.
FOR THESE JOBS HE SHOULD HAVE USED DIAPHRAGM PUMPS DESIGNED WITH NO CLOSE CLEARANCES BETWEEN WATER-MOVING PARTS
For jobs for 6000 G.P.H. or less on which mud, sand, and trash are to be encountered, use the diaphragm pump. Seepage is another diaphragm pump job.
Engines
Pavement Breakers
Light Plants
NOVO ENGINE CO.
LANSING, MICHIGAN
NOVO ENGINE CO.—200 Porter Street, Lansing, Mich.
Send information on Novo Diaphragm Pumps ☐
Self-Priming Centrifugals ☐ Pressure Pumps ☐ Hoists ☐
Light Plants ☐ Pavement Breaker ☐ Engines ☐
Name
Address
City State
Hoists

Natural Snow Fence Effective, Economical

(Continued from preceding page)

from drifting snow.

2. Sufficient elevation of the grade line above the surrounding natural ground so that the wind blows the snow over and across the road surface without depositing the snow on the traveled way.

3. Streamlining of all slopes, both cuts and fills, so that the wind-swept effect is produced.

4. Widening of cuts to provide for snow storage where drifting cannot be prevented because of natural obstructions which cause drifting on the roadway.

Safety First in Planting

Ohio has not planted trees and shrubs to trap snow, due chiefly to the limited right-of-way. The main efforts in Ohio toward snow control without recourse to mechanical-removal methods, according to Dallas D. Dupre, Jr., Landscape Architect, Ohio Department of Highways, lean toward:

1. A better cross section which will prevent drifting of snow.

2. Care in design of roadside improvement plantings so that they will not start snow drifting or aggravate an existing situation.

3. Care in mowing operations so as to remove shrubby growth and heavy weeds that might otherwise start drifting.

In regard to the first item, continues Mr. Dupre, a flatter cross section was first developed and found desirable to relieve a number of faulty engineering conditions. No thought was given to the value of such a section in relation to snow control. This value soon became apparent, however, and full thought and credit is given to good cross section with this as one of the major results. Additional right-of-way that would permit even better cross sections in hilly countries of Ohio would give greater protection against snow drifts.

Planting Saves Money

Pennsylvania, Michigan and Minnesota have each done considerable planting to create live snow-breaks. We are reporting in this article only the work in the Keystone state from data and photographs furnished by Wesley L. Hottenstein, Highway Forester, Pennsylvania Department of Highways. The Michigan and Minnesota work will be reported in a later issue.

The Forestry Unit of the Pennsylvania Department of Highways was established in 1929 and since that date a total of 41.4 miles of evergreen snow-breaks have been established at various locations throughout the state. These breaks have been planted from 60 to 100 feet from the edge of the traveled road surface. The main species of trees used have been Norway spruce, red pine, American arborvitae, Scotch pine, Douglas fir, balsam fir and, along highway sections adjacent to urban areas, several species of dogwood and other deciduous flowering trees and shrubs. These snow-breaks generally are composed of two or three rows of trees, planted in a staggered manner 6 feet apart in rows 8 feet apart.

Cost records kept for several sections of snow-breaks over a period of ten years show that the average cost of establishing and maintaining 1,000 feet of evergreen snow-break is $300 or $0.03 per foot per year, as compared with an average cost of $0.04 per foot per year for purchasing, erecting and maintaining standard department snow fence. In the fall of 1942, the Pennsylvania Department of Highways erected 2,565 miles of snow fence, indicating that, if in all cases live snow-breaks could be substituted for the mechanical kind, an annual saving of $135,432 could be effected.

The main reason why a greater mileage of live snow-breaks has not been planted is the restricted widths of right-of-way. In the majority of instances, efforts to secure additional widths are rejected by property owners because the rows of trees interfere with the complete utilization of their land.

Climax and McAlear Make Post-War Plans

Announcement has been made by the General Finance Corp., of which the Climax Engineering Co., manufacturer of internal combustion engines, power units and generator sets, is a subsidiary, of the recent acquisition of the McAlear Mfg. Co., Chicago producer of valves, regulating and control equipment. Edward F. Deacon, Climax President, will also serve as President and General Manager of the McAlear Co., and Mrs. P. G. McAlear, formerly President and now Chairman of the Board of the McAlear Co., will continue to be actively identified with the management.

Since products made by McAlear are widely used in the fields served by Climax, Mr. Deacon stated that this move would help both companies to broaden their service to customers. Currently, both companies are substantially engaged in the production of essential war goods, and on May 7, the Army-Navy "E" was awarded to Climax and its employees.

However, each company has broad post-war plans, with new developments now in process awaiting only the releasing of manufacturing facilities and materials. It was pointed out that the important immediate result of this acquisition will be the supplementing of engineering talents of each company which, plus economies of production and distribution, should accrue to the direct benefit of the customers of both companies in the post-war period.

Wood Preservatives

Suggestions for handling the growing widespread necessity for wood preservation are contained in an 8-page illustrated brochure recently published by I. F. Laucks, Inc., 911 Western Ave., Seattle, Wash. Directed toward constructors of heavy laminated beams and arches, as well as other wood products, "Laucks Wood Preservatives" explains the company's complete series of low-cost wood treatments. Among these are water-repellent toxic preservatives which meet the requirements of the National Door Mfrs. Assn. and the Western Pine Assn.

The booklet describes methods of treatment for protection against moisture and fungi decay, with a chart on the back page showing methods of application and needs for different types of preservatives, including water-repellent, toxic, and toxic water-repellent solutions.

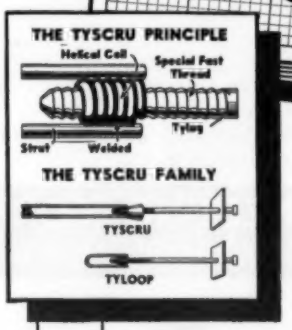
Copies of this booklet, "Laucks Wood Preservatives", may be secured by those interested direct from the manufacturer by referring to this item.

New Rubber Co. Sales Mgr.

The United States Rubber Co., New York City, has announced the appointment of D. W. Walsh as General Sales Manager, Tire Division. Mr. Walsh has been associated with the company since 1931 and became Assistant to the General Sales Manager last year.

FORM-TY ENGINEERING FACTS

For any condition arising in Tying and Anchoring Concrete Form Work -- "Richmond's" Tyscru System Costs Less to use.



These 5 Exclusive Advantages Will Save You Money On Any Kind of Concrete Job

(1) You save up to 2/3 the steel required for ordinary field assembled form-tying methods; such as Rods and Clamps or "she" bolts. (2) You lessen the cost of form work with Tyscrus because form work is planned for greatest economy. (3) The Tyscru System saves time and advances job progress; it exactly fits job conditions. (4) They may be easily and quickly used for reanchorage of lift forms, due to coarse threads. (5) Working parts are returnable for credit. No rentals charged.

And, in addition, our Job Planning Bureau will gladly save you and your men hours of time and many dollars in materials by providing job working drawings without extra cost. May we discuss your next job with you?

(It May Pay You To Tear Out This Ad And Save It)

RICHMOND SCREW ANCHOR COMPANY, INC.
816 LIBERTY AVENUE · BROOKLYN NEW YORK

I bought more than a PIPE BENDER! My Porto-Power licks maintenance jobs, too!

Blackhawk Porto-Power Pipe Benders would still be the choice of many experienced contractors and electricians—*even if the Blackhawk Bender could only bend pipe.* But, Man! — bending pipe (up to 4"), *and doing it well, is only part of the story!*

Simple attachments can be used with the Porto-Power Hydraulic Unit—to handle tough maintenance jobs, construction work and change-overs. Write for the V-43 catalog or call your Blackhawk Distributor for more details on how Blackhawk Benders can do all this extra work.

PULL DRIVE PULLEYS AND GEARS — Smoothly, safely. No crow bars! No sledging!

LIFT MACHINERY — Raise a 10-ton load from a low of 3½" to an 8½" height.

A JACK FOR ANY SPAN —ANYANGLE Your Blackhawk power unit is the most refined hydraulic jack available today!

BUILD YOUR OWN PRESS — Free blueprints! Use the powerful hydraulic unit furnished in the pipe bender.

BLACKHAWK

BLACKHAWK MFG. CO.
Dept. P1863, Milwaukee, Wisconsin
Rush your new Hydraulic Equipment Bulletin V-43 to us.

Name.....

Company.....

City and State.....

Old Bridges Repaired, Renewed by Welding

(*Continued from page 22*)

necting the stringers to the floor beams when they extend over the vertical legs of the flange angles unless there is enough space above the ends of the stringers under the top flanges of the floor beams to permit removing and installing the flange angles without fouling the floor beam flanges.

When there are cover plates, and only their connecting rivets are badly reduced, the rivets may be redriven, but when the plates are also badly reduced they should be renewed with prepunched plates and re-riveted.

In order to do the work above described, about one half the ties are temporarily removed to provide room to do the work. The remaining ties are shifted back and forth as necessary to expose all the rivets. This requires temporary speed reductions of trains between, as well as during, working hours and slows up traffic considerably.

When using the welding method to repair stringers without cover plates, the wedged and scalloped edges of the flange angles may be cut back with a burning torch to where there is thickness enough to take a good edge weld. Plain plates may then be placed on the flanges and continuous fillet welds run along the cut edges of the angles attaching the plates and at the same time sealing any space between the angles and the plates due to the unevenness of the top surface of the old flange angles.

In the case of stringers with cover plates, if the plates are suitable to retain, the feather edges of the angles and plates may be trimmed back as necessary and continuous fillet welds run along the edges of the angles as above described. If the plates require renewal they should be removed and the flange angles cut back and new plain plates applied and welded as described. This repair leaves no rivets above the plates to corrode and require redriving later.

In order to do this work, it is not necessary to remove any ties or shift them sideways. All that is necessary is to raise the complete track and deck intact with track jacks between the passage of trains to insert the cover plates on the stringers and then let the track and deck down to normal position. The flame cutting and welding is done from below. In this way, there is very little if any interruption of railroad traffic on account of the repair work. Similar treatment is applicable if the stringers are composed of I-beams.

Deck Girders and Trusses

The sections of girders and trusses are much greater than those of stringers and a loss of the same thickness of metal as that in the small section of the stringers does not weaken the girders and trusses as much so that less attention for repairs from corrosion is required, except for the rivets.

It is frequently necessary to cut out and redrive the rivets connecting the cover plates to the top flange angles of the girders and upper angles in the top chords of trusses because of the loss of heads from corrosion. If, however, these rivet heads are not allowed to become reduced in size too much or to become loose, they may be built up with weld metal at much less cost than to redrive them. The heads built up with weld metal will outlast the original or redriven rivets by many years.

Floor Beam Repairs

Floor-beam sections are usually made up of a web plate, two flange angles, and one or more cover plates. The brine drip attacks the upper surfaces of the top flanges most severely and the web plates next and the bottom flanges less severely.

The usual repair by riveting is to remove the only or the outer plate on the top flange and replace it with new material. A patch plate is usually attached to the web plate covering the full depth between the top and bottom flange angles and with a length sufficient to extend beyond the deteriorated area and to rivet onto good old material. This extends sometimes from the floor-beam connection to the stringer connection. In order that the patch plates may function properly, splice plates are connected over their edges and the vertical legs of the flange angles and, when necessary, similar splice plates are applied over the end connections of the floor beams, stringers and patch plates. This involves drilling new holes for the rivets in the old web plate and providing matching splice and patch plates and cutting out and redriving the rivets in the flange and connection angles.

Repairs to the bottom flange, when needed, may be made either by applying a patch plate on the upper side of the horizontal legs by removing and redriving rivets or, when the vertical legs of the flange angles are too poor, by applying another angle over them or by removing sections of the old angles, or removing them completely, and setting in new ones with splices as required.

To repair floor beams by welding, a new plate is applied over the upper plate in the top flange, either a little wider or narrower than the old plates to take the fillet weld. The new plate must have holes large enough to match and fit over the old rivet heads. The rivet heads are then welded to the plates, filling the holes to provide a smooth surface to exclude brine and water and, if desired, to seal the spaces between the uneven surfaces of the old plate and the edges of the new plate, a fillet seal weld is run along the edges.

Another method is to remove a section of the old cover plate to just beyond the limits of its corroded and reduced area and insert a plain new plate, butt-welding it in to the ends of the old plate left in place and then fillet-welding the new plate to the old flange angles. If desired, the new plates can be attached to the old flange angles by riveting, in which case the new plates should preferably be prepunched.

Repair to the webs may be made by cutting a patch plate with beveled edges to fit in between the top and bottom flange angles and connection angles of floor beams and stringers, with the required clearance, and butt-welding all four sides to the flange and connection angles. This leaves a smooth surface and no additional rivet heads to corrode.

Repairs to the bottom flanges may be made by placing a patch plate, prepunched with large holes to fit over the rivet heads, in the horizontal legs of the flange angles and welding the old rivet heads to the new plate, filling the holes in the plates in order to exclude brine and water.

(*Concluded on next page*)

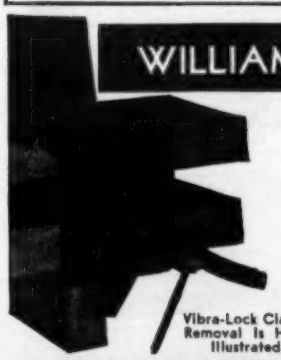
WILLIAMS "SUPER-Hi" TENSILE TIE RODS
INEXPENSIVE U. S. STANDARD THREAD RODS

For heavy construction, use Williams "Super-Hi" Tensile Tie Rods. No job too large; none too small—to warrant Williams economy and speed. There will be a tremendous amount of dam construction after the War.

Start laying your plans now. Write for complete details on the Williams Tie Rods.

⅞" diam. U. S. — 16 thd.			⅜" diam. U. S. — 13 thd.		
9,500 lbs. Ultimate Tensile 7,500 lbs. Working Load per Rod			16,500 lbs. Ultimate Tensile 13,000 lbs. Working Load per Rod		
LENGTH of Rod	Price per 100 rods	App. Wall Width	LENGTH of Rod	Price per 100 rods	App. Wall Width
12" or less	$3.00	15" or less	12" or less	$4.00	15" or less
Over 12" add ¼c per inch			Over 12" add 1/3c per inch		

WILLIAMS "VIBRA-LOCK" CLAMPS



Vibra-Lock Clamp Removal Is Here Illustrated

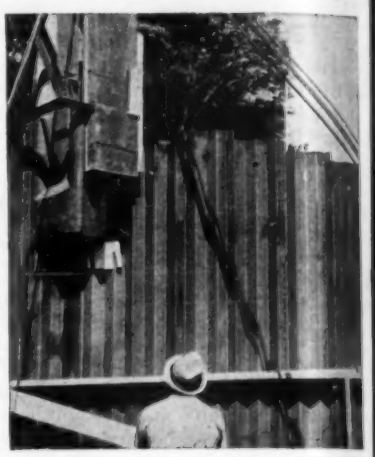
Use Williams *Vibra-Lock* Clamps for dams, bridges, heavy construction, battered walls, etc. Adjustable and flexible for all purposes, these clamps will hold the forms rigidly and produce accurate results.

Use Williams *Simplex* Clamps for best results in concrete construction for sewage disposal plants, filtration plants and buildings.

Send us your plans and we will figure the ties, showing locations, etc.

WILLIAMS FORM ENGINEERING CORP.
Box 925, Madison Square Station, Grand Rapids, Michigan

IT DOES THE JOB Without Wasting Steel



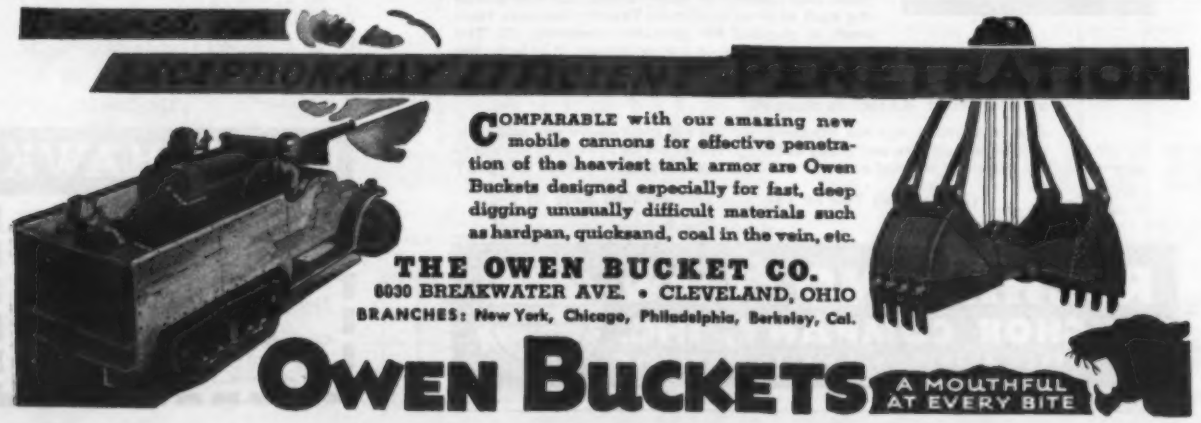
Steel is too precious to be wasted, even on vital war projects. When metal sheeting *must* be used, ARMCO can show you how to do the job and not waste steel.

Lightweight ARMCO Sheeting carries no excess metal. Lengthwise corrugations provide a stiff backbone—help it to stand up straight without flinching under driving blows. Fewer sections are needed to do the work because this sheeting can readily be pulled and used over and over again.

Other advantages lead to time-and-labor savings. ARMCO Sheeting goes in fast owing to its smooth surface and small displacement. It is also nestable, for storage and shipping.

Order ARMCO Steel Sheeting in the exact gage and width you need. It is supplied in the following types: Flange (12 in. width, 12 to 3 gage, max. length 18 ft.), Clip (12 in. width, 12 to 10 gage, max. length 16 ft.), Interlocking (14 in. width, 12 to 7 gage, max. length 18 ft.). Armco Drainage Products Assn., 325 Curtis Street, Middletown, Ohio.

ARMCO SHEETING


COMPARABLE with our amazing new mobile cannons for effective penetration of the heaviest tank armor are Owen Buckets designed especially for fast, deep digging unusually difficult materials such as hardpan, quicksand, coal in the vein, etc.
THE OWEN BUCKET CO.
6030 BREAKWATER AVE. • CLEVELAND, OHIO
BRANCHES: New York, Chicago, Philadelphia, Berkeley, Cal.
OWEN BUCKETS
A MOUTHFUL AT EVERY BITE

Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York, *today*)

From_____
(Former address)

To_____
(New address)

Name_____

Firm_____

Position_____

Welding Saves Money In RR Bridge Repairs

(Continued from preceding page)

Savings by Welding

A riveting gang usually consists of four men—a riveter, bucker up, heater, and rivet sticker. The equipment required for riveting includes an air compressor with a gas-engine drive, pipe and hose air line, riveting hammers, dollies, forge, drift pins, reamers, fitting up bolts, washers, cutting off chisels, and rivet busters.

A welding gang usually consists of two men—a welder and a helper. The equipment required for welding includes a 300 or 400-ampere gas-engine-driven welding unit, rubber-covered copper cable, electrode holders, clamps, and a burning outfit to clean the steel for welding.

In addition to the riveting and welding gangs, about four more men are required for the riveting gangs and two more for welding gangs to assemble and adjust any material to be applied and to remove any old material to be discarded. Temporary scaffolds are required for both classes of work but generally that for work done by riveting must be sturdier than for work done by welding. Steel frames or brackets to support the scaffold planks are commonly used. They are temporarily welded to the bridges. This is found to be a very satisfactory, convenient and economical fastening.

When it is necessary to have riveting equipment to repair and strengthen riveted bridges, the work is expedited and the costs of repairs are reduced materially if a good welder and welding equipment is included with the riveting gangs so that riveting or welding may be utilized to the best advantage. The welder should be able to rivet or do other work in the riveting gang when no welding work is required. Occasionally a whole repair job can be done by a welding gang without the assistance of a riveting gang. The cost of such jobs is about half of the cost if done by riveting.

The usual run of bridge repair work is of such a varied nature that the proportion of such work which can be done by either process cannot be estimated without considering each job separately. However, a conservative estimate of the average saving by the use of the welding method for the past 15 years in the cost of such work done on the Erie Railroad, with which the author is familiar, has increased gradually each year and within the last year amounts to about $15,000 on a $100,000 repair program. This averages about $7.00 per mile of railroad. If this average could be applied to all the principal railroads in the United States, it would amount to an annual saving of about $1,500,000.

This article is a portion of a study which was awarded an Honorable Mention in Class L2, Maintenance of Structures and Structural Applications, in the recent Industrial Progress Award Program of The James F. Lincoln Arc Welding Foundation.

New Electric Motors

A new line of totally enclosed Tri-Clad motors, designed for use under conditions where abrasives, rain, snow, and excessive dirt are encountered, has recently been announced by the Motor Division of the General Electric Co., Schenectady, N. Y. They are available in both the polyphase 60-cycle induction and single-phase 60-cycle capacitor types, and have all the important basic features of the Tri-Clad group, including protection against physical damage, electrical breakdown, and normal operating wear and tear.

In addition, all parts of the motor enclosures, including frame, end shields and conduit boxes, are of cast iron, offering resistance to rust, corrosion, accidental blows, and rough usage. The leads are permanently encased in a compound in a cast-in pocket in the stator frame, thus preventing liquids from seeping into the motor. Further protection is provided in the form of a rotating labyrinth seal, which prevents dirt, oil or water from entering the bearing housing.

The polyphase motors are furnished in frame sizes 203 to 225, with ½, ¾ and 1 hp at 900 rpm; ¾, 1 and 1½ hp at 1,200 rpm; and 1½ and 2 hp at 3,600 rpm. The single-phase motors are available in frame sizes 203 to 204, and include ¾ hp at 1,200 rpm; 1 and 1½ hp at 1,800 rpm; and 1½ and 2 hp at 3,600 rpm. The mounting dimensions of these motors are interchangeable with Tri-Clad open motors of the same rating.

Further information on these new Tri-Clad electric motors may be secured direct from the manufacturer by mentioning this item.

If Your Construction Job Is Halted by WPB

Where construction projects are stopped through the issuance by the War Production Board of revocation or stop orders, the contractors will be advised in the future to contact redistribution officials of the appropriate regional office in regard to disposal of material purchased for projects which have been halted.

The Redistribution Division of WPB will assist contractors in disposing of material and equipment made available as the result of the revocation or stop orders. In the future, a paragraph embodying this suggestion will be added to the orders.

DRILLMASTER
COMPRESSOR & TOOLS UNIT
Air Power and Air Tools—
When and Where You Need Them...

"HERE'S A PACKAGE"—designed for the many jobs required in construction and maintenance that call for a portable compressor and the tools to put this power to work . . . No matter how distant or how inaccessible your location is—one order, one shipment, brings you this compact, ready-to-work power plant and tools.

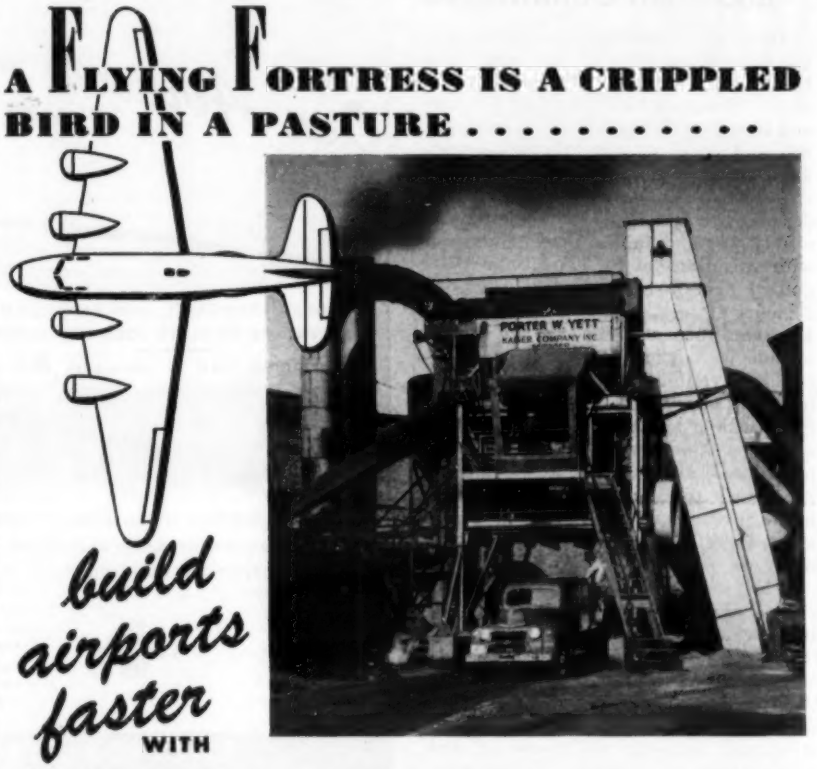
They're All in This Complete Unit

A Model 105 SCHRAMM Compressor with special racks and tool boxes with fixed locations for each tool and accessory, so that most any compressor requirement that arises can be met and handled. Equipment includes: Double hose reels, live air type, each equipped with three 50-ft. lengths of ¾" air hose. Air receiver with three extra outlets, equipped with quick action valves, hose couplings and 3½" vise for flat or pipe work, on swivel base. Tools recommended depend entirely on user's requirements and the ability of tool manufacturer to furnish them under existing conditions.

Write Today for Bulletin C-9

SCHRAMM INC.
THE COMPRESSOR PEOPLE
WEST CHESTER, PA.

A FLYING FORTRESS IS A CRIPPLED BIRD IN A PASTURE . . . . . .



build airports faster WITH

MADSEN ASPHALT PLANTS

Yes, Flying Fortresses and all our fighting aircraft are crippled birds without paved airfields. You, the paving contractor, are giving *wings* to these birds and Madsen Asphalt Paving Plants are giving *wings* to your paving jobs for Madsen plants are noted for their faster mixing cycle . . . greater production . . . and high efficiency.

Twenty-nine years of pioneering in the design and construction of asphalt paving plants has built the Madsen reputation. Madsen pioneered one-man control of mixing operations which increased production and reduced operating costs. Introduced the unit-type plant and the famous jack-erection system which makes Madsen plants easier to move and easier to erect. Introduced asphalt pressure injection which increases production and assures more uniform mixing in a shorter mixing period.

Constant improvements, which save seconds in every batch and hours in daily plant operation have made Madsen the accepted leader in the asphalt plant field. Madsen plants range in capacity from 500 lbs. to 6000 lbs. There are two types: (1) the crane-erection type and (2) the jack-erection type. If you have an important wartime paving job, it will pay you to know the facts—write for more information today! Jack- and crane-erection plants are available in stock!

MADSEN IRON WORKS
HUNTINGTON PARK • CALIFORNIA
ASPHALT PLANTS · ROAD PUGS · FINISHERS · DUST COLLECTORS
BATCHERS · ROLL-TAMPS · DRYERS · BOILERS · ASPHALT TANKS

Testing Lab Storage Room Air-Conditioned

To provide standard atmospheric storage conditions for concrete specimens to be tested, the specimen storage room of the Materials Laboratory of the City and County of Denver, Colo., is equipped with a Carrier air conditioning system. The storage room is approximately 14 x 18 feet, in which a temperature of 70 degrees F and 100 per cent relative humidity are maintained the year round, with variations of no more than 2 degrees F. The inside walls are lined with 2 inches of cork, having a mastic finish. The reinforced-concrete roof is insulated outside with 5 inches of cork and covered with roofing paper. The door is 2½ inches thick, made of sheet copper and filled with granulated cork. The inside walls are painted with special aluminum paint, and the shelves are made of 2 x 4-inch pine and painted. All metal in the room is either copper or brass, and all electrical conduits and light fixtures are moisture-proof.

When the temperature in this room rises above 72 degrees F, the Carrier refrigerating unit pumps a refrigerant through the air conditioning coils, thus cooling the air current as it passes into the room. When the temperature of 68 degrees F has been reached, the refrigerating unit automatically turns off and heaters turn on. The air current then circulating in the room is warmed. This cycle of alternate heating and cooling may be continuous. However, it has been found that in warm weather the heaters can be dormant, and similarly the refrigerating unit can be switched off in cool weather.

Humidity is maintained by water being atomized continuously through a small nozzle, thus creating a dense fog. The blower which circulates the warmed or cooled air and also diffuses the water vapor operates almost continuously, inasmuch as the room has been kept in use for all but a few weeks during the past nine years.

Mack Moves Offices

The pressure of war work has necessitated the removal of the executive offices of Mack Trucks, Inc., from quarters in the company's Long Island City plant into new offices in the Empire State Building, New York City. This move on June 1, according to Mack officials, will add thousands of feet of floor space in the Long Island City plant for the production of war material.

Mack recently expanded its truck and marine-engine production lines at Plainfield and New Brunswick, N. J., and at Allentown, Pa., by acquiring factories in and near those cities.

Seven CAA Airport Jobs Reinstated by the WPB

Work will be resumed on seven CAA airport projects which were halted on January 15 by the WPB. The reinstatement order does not authorize completion of all of the projects, but sufficient work will go ahead to make them suitable for emergency landing and servicing fields.

The airports released from stop orders are located at Willcox, Ariz.; Cushing, Okla.; Bradford-Kane, Penna.; Nogales, Ariz.; Natchez, Miss.; Mason City, Iowa; and Artesia, N. M.

Our Airports must be built...
FOR KEEPS!
DESIGNED REINFORCED CONCRETE RUNWAYS
CAN ENDURE TO SERVE POST-WAR AVIATION
REINFORCING STEEL IS AVAILABLE Use it!

The Specification of Laclede's Complete Line of Proved Pavement Reinforcement Conserves Vital Materials by Building Well.

- Welded Wire Mesh
- Reinforcing Bars
  - Billet Steel
  - Rail Steel
- Steel Center Joint
- Recess Joint
- Expansion Joints
- Construction Joints
- Welded Dowel Spacers
- Welded Bridge Floor Trusses
- Pavement Accessories
- Bridge Accessories
- Steel Pipe
- Wire
- Welded Stirrups

LACLEDE

LACLEDE STEEL COMPANY
GENERAL OFFICES ARCADE BUILDING ST. LOUIS, MISSOURI
BRANCH OFFICES • CHICAGO • KANSAS CITY • DETROIT

HAISS

BIGGER PAYLOAD BUCKETS

For TRENCHING
...the Narrow-bowl HI-POWER in ½ and ¾ yd. sizes is a master workman.
For EXCAVATING
...a full line of HI-POWER Buckets with variable reeving for up to 7:1 closing ratio.
For REHANDLING
...the Haiss MULTI-SHEAVE in a full range of sizes. Fast, sturdy and long lived.

Haiss has the right bucket for your particular job, engineered all the way to give you bigger pay-loads through improved design and construction. A Haiss Bucket gives your crane a chance to break its own best performance records. Every Haiss Clamshell is built to do its particular type of work better. Fifty years of skill and experience in manufacture back it up.

★ *Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.*

GEORGE HAISS MANUFACTURING CO., INC.
Canal Place & East 142nd St., New York, 51, N. Y.

GOODALL *Was on the Job!*

THE DELAWARE RIVER BRIDGE

is typical of the important construction jobs, throughout the years, on which Goodall hose, belting, boots and clothing have demonstrated their quality and reliability. Such brand names as "Judson", "Inferno", "Subway" and "Buckskin" were the construction industry's *buy*-words for rubber hose, then, as now; and belting, boots and wet-weather clothing bearing the Goodall label were equally well-known and widely used.

"73 Years of 'Know-How'" enables the Goodall-Whitehead factory to continue to furnish mechanical rubber products that are more than adequate for their specified services, despite restrictions on natural rubber. Contact our nearest branch or main office regarding your requirements.

MAIN OFFICE—2 S. 36th St., PHILADELPHIA, PA.
Branches: New York • Boston • Pittsburgh • Chicago. Gov't. Dept.—Washington, D. C. West Coast—Goodall Rubber Co. of Calif.: Los Angeles, Seattle, San Francisco, Salt Lake City. Factory: Trenton, N.J. (Est. 1870.)

WE ARE PARTICIPANTS IN THE OWNERSHIP AND OPERATION OF NATIONAL SYNTHETIC RUBBER CORPORATION

Buy, Buy BONDS—Means Bye-Bye Axis!

GOODALL
RUBBER COMPANY INCORPORATED

Resealing Operations On New Mexico Roads

(*Continued from page* 46)

depending on the character of the surface. If it is impervious, then the smaller quantity is all that is needed to provide sufficient adhesion for the stone. On the other hand, if the road is of an open texture, so that some of the asphalt is absorbed, the larger amount of asphalt is applied.

The crushed-stone chips are applied at the rate of 10 pounds per 0.1 gallon of asphalt, using ⅝ to ⅜-inch crushed-stone chips with all the material finer than 10-mesh removed. The actual amount of chips applied depends largely on the character of the surface of the road being sealed. If the road surface absorbs a considerable portion of the larger application of asphalt, then the amount of chips applied is reduced. The chips are applied by Buckeye chip spreaders, permitting accurate control of the rate of application. The initial rolling is by an 8 to 10-ton 3-wheel roller, followed by continuous drag-brooming with a rig 10 feet wide and about 15 feet long, using steel brushes on the frames. The road is then opened to traffic and a 5-ton roller is used for as long as necessary to incorporate the loose chips which are kicked back onto the road by a rotary broom. This work continues for as much as five days. As soon as the rolling starts, the road is opened to traffic to get the benefit of the traffic compaction added to the regular rolling.

The equipment used for the work includes a shovel to load the chips to the trucks, a 1,000 or 1,200-gallon distributor, from two to twenty trucks, depending on the haul, from three to five booster tank trucks to haul the asphalt, a booster heater for the tank cars, as well as the equipment already mentioned. Even though the haul is as much as 75 miles, no auxiliary heating is used for the insulated booster or ferry tank trucks as the asphalt is heated to its maximum before being loaded and the loss of heat is not sufficient to delay work when the asphalt is transferred to the distributors where it is again brought up to the specified temperature for application to the roadway.

Personnel

This type of work is done under the direction of the District Engineers, with a foreman and timekeeper from the District headquarters to look after the crew. Charles M. Johnstone is Maintenance Engineer of the New Mexico State Highway Department.

Road Bill Provides Funds for Planning

The House Roads Committee has drawn up a new highway bill which would make unobligated Federal-Aid funds immediately available for advance planning as well as for the acquisition of rights-of-way for post-war construction. At the same time, the bill would amend the existing law so as to prevent the states from losing any funds due to their unobligated status. On June 30, 1943, $68,000,000 of such funds would normally lapse, and an additional $303,000,000 would be lost on June 30, 1944.

It is believed that the Committee will earmark $50,000,000 for advance planning to be made available to the states, under a formula yet to be determined, on a 75-25 matching basis. Indications are that the Committee will favor a 50-50 matching basis as far as right-of-way funds are concerned.

In addition, it is expected that the Committee will include two new amendments to the bill. One will make provision for the reimbursement of states, cities and counties for road damage sustained by war traffic. This would broaden the present law which restricts reimbursement to damage done by Army and Navy vehicles. The second amendment will direct the Commissioner of Public Roads to make an immediate survey as to the need for a system of express highways.

Keep Tank Cars Moving

An appeal for the cooperation of bulk suppliers and purchasers of petroleum products to make possible round-the-clock loading and unloading has been made by Joseph B. Eastman, Director of the Office of Defense Transportation. Warning that increasing military and naval demands for petroleum products would offset recent and anticipated gains in the eastern movement of oil and the general improvement of wartime petroleum transportation, Mr. Eastman indicated that the petroleum transport crisis probably would continue as long as material shortages prevent any great expansion of facilities.

"It is necessary," he said, "to squeeze every possible moment of efficient use out of the facilities now available. For tank trucks that means the assumption of a still greater proportion of the short-haul movements for which their service is the most efficient."

It was pointed out that tank trucks waiting to load or unload are not releasing tank cars for movements of petroleum to the East.

To Scrap or Not to Scrap WPB Helps Solve Problem

To determine whether a piece of equipment or material should be used in its present form or put into war production in the form of scrap, the Special Projects Salvage Branch of the Salvage Division, WPB, is publishing "Available Used Material and Equipment Bulletin".

This publication is distributed to approximately 3,000 government procurement offices and contractors, including the services and other war agencies, covering most of the market for war uses. If any material or equipment listed in the bulletin can be put to use by these agencies, they get in touch with the owner for purchase and the listing is terminated. If the material or equipment has not been sold after a stipulated period (usually 60 days), the Regional Office of the WPB takes every possible step to move the material as scrap.

A great deal of existing equipment is "borderline"; that is, it is hard to say whether it is usable "as is" or should be scrapped. Failure on the part of 3,000 war agency purchasers to ask for the equipment is a good indication that it cannot be used in the war effort.

Listing in the Bulletin is possible only after an investigation by the WPB Regional Office and routine reporting of the project has been made. As a direct result of the publication, thousands of tons of metal have been moved as scrap, and thousands of pieces of idle equipment put to work in the war effort.

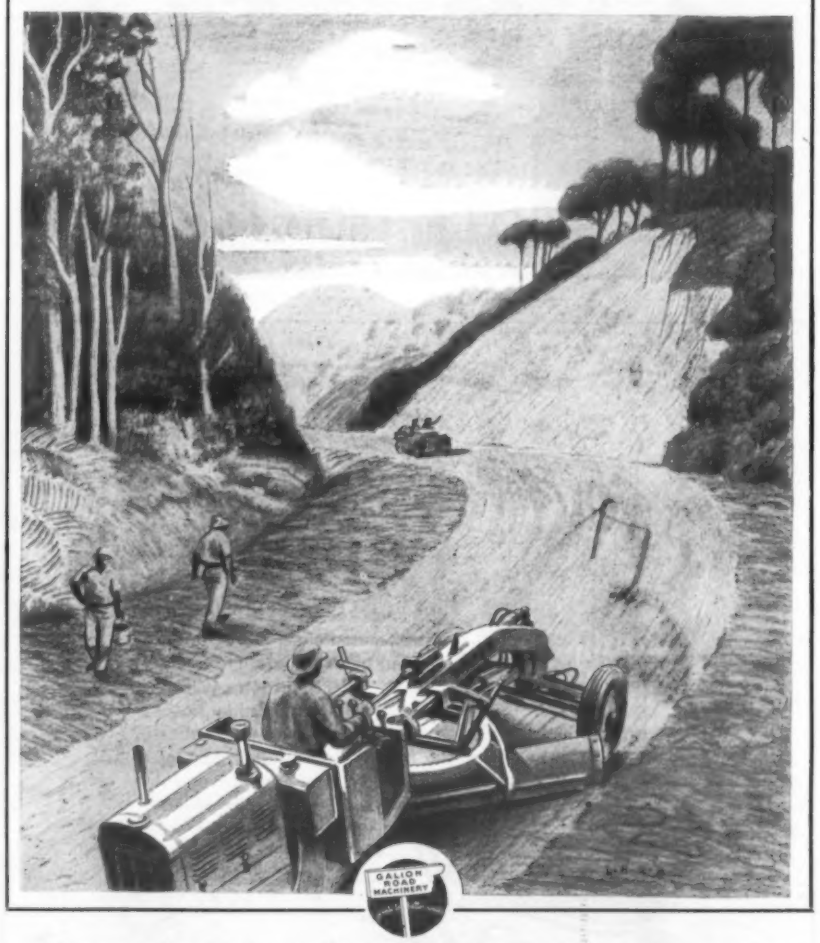
New SKF Sales Manager

The appointment of Robert R. Zisette as General Sales Manager of SKF Industries, Inc., Philadelphia, Penna., manufacturer of ball and roller bearings, has been announced. Mr. Zisette has been associated with the company since 1921, having served as Sales Engineer in the Cleveland Office and District Manager of the Cincinnati Office, and for the past year has been Assistant Sales Manager.

Let this new HOBART DATA SERVICE
BE YOUR GUIDE!
Valuable Information that will save you time, money and material FREE!
To help you, we have compiled this special service. It helps you locate metals that will solve your construction or maintenance problems. Ask for your copy on your letterhead.
Hobart Bros., Box CE-63 Troy, Ohio
HOBART Simplified ARC WELDERS
One of the World's Largest Builders of Arc Welders

Dig out the facts . . . why MICHIGAN Mobile Trench Hoes speed vital trench-digging jobs . . . why MICHIGAN speed, mobility, low maintenance costs pay dividends. Write for Bulletin T.

MICHIGAN POWER SHOVEL COMPANY
BENTON HARBOR MICHIGAN



Adequate and convenient roads vital to Defense of the Americas . . Galion motor graders active on such projects as Alcan Highway—Trans-Isthmian Highway.

The Galion Iron Works & Mfg. Co.
Main Office and Works: **Galion, Ohio**

Paving Service Roads At New Ordnance Depot

(*Continued from page 9*)

tration asphalt was added and the homogeneous mix delivered to trucks waiting in a depressed roadway at the end of the plant. Straight-line production was the feature of this set-up. A fleet of twelve trucks hauling 6 tons per load served the plant.

Personnel

The crew necessary for the efficient operation of this plant, including the crane and tractor, was as follows: one foreman, one craneman and one oiler, three laborers in the cars, three laborers around the plant, one fireman and one helper, one drier fireman, one mixer man, one engineer, and the Cat skinner. This was the crew for one shift and the plant was operated two 10-hour shifts.

This asphalt-paving operation at a mountain-state Ordnance Depot was completed by contract under the direction of the U. S. Engineer Department. In the interest of national security, mention of the location of and personnel connected with U. S. Army construction is omitted.

Electrode Production Up

The production of shielded arc electrodes, which has been far below essential requirements during the past year and a half, is increasing steadily and is now slightly in excess of current consumption needs, the General Industrial Equipment Division of the WPB announced recently. March production totaled 96,000,000 pounds as compared with 30,000,000 pounds in January, 1942, and 88,000,000 pounds in January, 1943.

As the ratio of production to consumption becomes more favorable, inventories which have been depleted during the long period of scarcity will be built up. Because of the essential nature of electrodes in war production, steps have been taken by WPB to control distribution and to prevent a few large users from getting over-large inventories with resultant scarcity elsewhere.

Hoist For Sale

1—USED **NOVO** WHG DRAGLINE HOIST with 50-hp. Buda Engine; ¾-yd. Bucket. Rebuilt, excellent operating condition.

1—45-hp. **International** Gasoline Power Unit, Rebuilt.

Lakeshore Machinery & Supply Co.
400 W. Laketon Ave., Muskegon, Mich.
Phone 2-6655

LIVE AT NEW YORK'S HOTEL LINCOLN
45th St. at 8th Ave.
MARIA KRAMER, President — JOHN L. HORGAN, Gen. Mgr.
1400 SPACIOUS ROOMS from $3
with private bath and radio
Home of the world famed BLUE ROOM
Featuring Radio's Name Bands
other MARIA KRAMER hotels
HOTEL EDISON, New York City
ROOSEVELT HOTEL, Wash., D. C.
A Great Name - A Great Hotel

Travelers Prefer this
"CENTER OF ACTIVITY"
LOCATION IN
MILWAUKEE
Milwaukee's BEST BUY in hotel accommodations. Right in the heart of the city, close to everything! 450 fine rooms with superior comfort. Friendly hospitality that travelers like. Coffee Shop and Cocktail Lounge. Garage and convenient Parking Lot. Excellence without extravagance.
WITH BATH FROM $2.75
WITHOUT BATH FROM $1.65
LEWIS S. THOMAS, Mgr.
Styled for Comfort
HOTEL Wisconsin
OWNED & OPERATED BY MILWAUKEE HOTEL WISCONSIN COMPANY

Directory of EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of various lines handled.

GARLINGHOUSE BROS.

2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

BROWNING—Truck Cranes, Shovels, Locomotive Cranes
DEMPSTER—Dumpsters
DIAMOND IRON WORKS—Crushers, Portable Gravel Plants
DAVEY—Compressors
LAMBERT-NATIONAL—Hoists and Cableways
McKIERNAN-TERRY CORP.—Pile Hammers
A. LESCHEN & SONS—Wire Rope
NOVO—Engines, Pumps, etc.
OMAHA—Dragline Buckets
OWEN—Clamshell Buckets
RANSOME—Concrete Mixers, Pavers, etc.
UNIVERSAL—Panel Forms, Form Clamps, etc.

Manufacturers of

GAR-BRO—Concrete Carts, Wheelbarrows, Concrete Hoppers, Buckets, etc.

Member: Associated Equipment Distributors

EDWARD R. BACON CO.

Folsom at 17th St.
San Francisco, Calif.

Aeroil Emulsion Distrs.
American Concrete Grinders
"Berg" Concrete Surfacers
Byers Shovels, Cranes
Cleveland Trenchers
Dobbie Derricks, Fittings
Erie Rollers
Gar-Bro Barrows, Carts
Hercules Power Units
Heugh Sweepers
Huber Rollers
Interstate Tramways
Jackson Concrete Vibrators
Jaeger Mixers, Pumps, Hoists, Paving Equip.
Jones Saw Benches
Kissler Clamshell Buckets
Kohler Lighting Plants
Littleford Wheeled Rollers
McKiernan-Terry Pile Hammers
Marion Shovels, Cranes, Draglines
Nelson Bucket Loaders
Ohio Locomotive Cranes
Page Dragline Buckets
Porta Conveyors
Ramsey Winches
Rogers Bros. Trailers
Schramm Air Compressors
Symons Cone Crusher, Vibrating Screens
"Thor" Air Tools
Toledo Torches
Wiard Plows
Winslow Scales

Member: Associated Equipment Distributors

NORRIS K. DAVIS

400 Seventh St. San Francisco, Calif.

Representing

DAVIS COMPANY—Large Tilting Mixers, 1, 2, 3, and 4-yd., Weigh Batchers, Batching Plants, Manual or Full Automatic Operation, Readymix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Bins, Hoppers, etc.
W. E. GRACE MFG. CO.—Road Sweepers.
HANSON CLUTCH & MACHY. CO.—Full Revolving Shovels, Cranes, Draglines, ⅝, ½, ⅝, and ¾-yd.
LE ROI CO.—Gasoline Power Units and Parts
MINN. STL. & MACHY. CO.—Twin City Engines, parts
NORTHERN CONVEYOR CO.—Stationary & Portable Conveyor Units
O. K. CLUTCH & MACHY. CO.—Hoists & Compressors
SNOW REMOVAL EQ. CO.—Botoblade & Sierra Snow Plows
EARL WALKER CO. INC—Rd. Oilers, Walker Bars

Member: Associated Equipment Distributors

HARRON, RICKARD & McCONE COMPANY

2070 Bryant St., San Francisco
3850 Santa Fe Ave., Los Angeles

Representing

American—Hoisting Equipment
*Broderick & Bascom—Wire Rope
Esco—Dippers, Dragline Buckets, etc.
Essick—Plaster Mixers, Rollers, Hoists
Gorman-Rupp—Pumps
Insley—Excavators
C. S. Johnson—Bins and Batchers
Koehring—Shovels, Mixers, Pavers, Dumptors
Kwik-Mix—Mixers
*Littleford — Bituminous Equipment
Mall—Vibrators
National Lead—Cinch Anchor Specialties
Parsons—Trenchers
Paxson—Bearcat Saw Tables
Pioneer—Gravel Equipment
Sterling—Wheelbarrows
Vulcan—Pile Driving Equipment

*Not handled in Los Angeles territory.

Member: Associated Equipment Distributors

THE PAVING SUPPLY AND EQUIPMENT COMPANY

10th & Girard Sts. N.E., Washington, D.C.
657-59 East 25th St., Baltimore, Md.

Exclusively

J. D. Adams Co.
Barber-Greene Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Co.
Buffalo-Springfield Roller Co.
C. H. & E. Mfg. Co.
Cleaver-Brooks Co.
Construction Machinery Co.
International Harvester Co.
Kinney Manufacturing Co.
White Mfg. Co.

Everything in construction equipment.

Member: Associated Equipment Distributors

FLORIDA-GEORGIA TRACTOR CO.

Jacksonville—Lakeland—Miami

American Cable Div., American Chain & Cable Co.
Brookville Locomotive Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Co.
Tractor Equipment
Buda Co.
Chain Belt Co.
Cleaver-Brooks Co.
Cleveland Formgrader Co.
Electric Tamper & Eq. Co.
Euclid Rd. Machy. Co.
Four Wheel Drive Auto Co.
Gallion Allsteel Body Co.
Hesco Mfg. Co.
Gallion Iron Wks. & Mfg. Co.
Holtzel St. Form & Iron Co.
Hough Co., Frank G.
Ingersoll-Rand Co.
Ingram Equipment Co., J. E.
Int'l Harvester Co.
Iowa Mfg. Co.
Jones Superior Mach. Co.
Kensington Steel Co.
Marlow Pumps
Murphy-Diesel Co.
Northwest Engrg. Co.
Owen Bucket Co.
Page Engrg. Co.
Rogers Bros. Corp.

LLEWELLYN MACHY. CORP.

1030 N. Miami Ave., Miami, Florida

Allied Companies
Atlas Imp. Diesel Eng. Co.
Austin-Western Rd. Machy. Co.
Barber-Greene Co.
Blystone Mfg. Co.
Browning Mfg. Co., Inc.
Century Electric Co.
Climax Engrg. Co.
Comm'l Shearing & Stamping Co.
Cooper Mfg. Co.
Crocker-Wheeler Elec. Mfg. Co.
Henry Disston & Sons, Inc.
Dodge Mfg. Corp.
Farm & Home Machy. Co.
Goulds Pumps, Inc.
W. W. Grainger, Inc.
Independent Pneu. Tool Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Edw. E. Johnson, Inc.
LeRoi Co.
Link-Belt Co.
Littleford Bros.
Marshalltown Mfg. Co.
Morse Chain Co.
F. E. Myers & Bros. Co.
Northwest Engrg. Co.
Novelty Steam Boiler Wks.
Novo Engine Co.
Ohio Pattern Wks. & Fdy. Co.
Owen Bucket Co.
Page Engrg. Co.
Permutit Co.
Roberts Filter Mfg. Co.
Sasgen Derrick Co.
A. P. Smith Mfg. Co.
Square D Co.
Stearns Mfg. Co.
Stover Mfg. & Engine Co.
Viking Pump Co.
Wall Rope Works, Inc.
Whitehead Bros. Rubber Co.
Wickwire Spencer St. Corp.
Wisconsin Motor Co.
Yale & Towne Mfg. Co.
Yates-American Machine Co.

P. A. NEFF

1920 N. W. Miami Court, Miami, Fla.

Sales—Service—Rentals

Butler Bin Co.—Bins, Batchers, Scales
J. I. Case—Industrial Contractors
Chain Belt Co.—Mixers, Pumps, Pavers
De Walt Products Corp.—Wood Working Machines
Independent Pneumatic Tool Co.—Air Tools, Electric Drills, Hammers; Hand Saws
Lansing Co.—Wheelbarrows, Concrete Carts
Le Roi Co.—Air Compressors
Mall Tool Co.—Vibrators, Saws, Terrazzo Machines

Miscellaneous Contractors Supplies

YANCEY BROTHERS, INC.

634 Whitehall St., S. W.
Atlanta, Ga.

American Manganese Jaws
American Cable Wire Rope
Barber-Greene Ditchers, Conveyors, Asphalt Equipment
Barnes Pumps
Buffalo-Springfield Rollers
"Caterpillar" Tractors, Graders, Power Units, etc.
Cedar Rapids Crushers
Clyde Hoists
Connery Kettles, Tools
Durex Saw Rigs
Grace Sweepers, Tank Car Heaters
Ingersoll-Rand Air Compressors, Air Tools
Jackson Vibrators
Johnson Bins, Batchers, Bulk Cement Plants
Killefer Rippers, Harrows, Drag Scrapers, Plows
Kinney Asphalt Distributors
LaPlant-Choate Bulldozers, Trailbuilders, Tamping Rollers
LeTourneau Carry-all Scrapers, Angledozers, Rooters
Metaform Road, Sidewalk, Curb & Gutter Forms
Page Dragline Buckets
Red Edge Shovels
Red Star Wheelbarrows, Concrete Carts
Rex Mixers, Pumps, Pavers
Russell Road Plows
Thew-Lorain Shovels
Timken Drill Bits & Rods
Wiard Road Plows
"Williams" Buckets

Member: Associated Equipment Distributors

F. H. BURLEW COMPANY

3401 South Hoyne Ave., Chicago, Ill.

Telephone: VIrginia 1100

BATES Wire Ties, etc.
BYERS Crawler Cranes, Shovels, Draglines
BEEBE BROS. Hoists
CHAIN BELT Mixers, Pavers, Pumps, Elevators, Pumpcrete, Moto Mixers
ERIE Steel Bins, Batchers, Aggremeter Plants
H & M Form Clamps
MEYER-HECHT Adjustable Shores
NORDBERG Track Shifters and Tunnel Shovels
SASGEN Derricks
SCHRAMM Air Compressors, Tools
Winslow Whlb. Scales

McKiernan-Terry Corp. (Divisions)
McKIERNAN-TERRY—Pile Hammers, Extractors
LAMBERT-NATIONAL—Hoists, Cableways
STEELE & CONDICT—Special Machinery

Wheelbarrows, Hose, Cable Rope, Tarpaulins, Vibrators, etc., carried in stock

Member: Associated Equipment Distributors

CHICAGO CONSTRUCTION EQUIPMENT COMPANY

8020 S. Halsted St., Chicago, Ill.

Sales—Rentals—Service

Aeroil—Tar Kettles
Carver—Centrifugal Pumps
Centaur—Hi-Way Mowers
C. H. & E.—Saw Rigs, Hoists, Pumps
Cleveland—Rock Drills, Paving Breakers, Air Tools
Galion—Rd. Machy., Graders, Motor Patrols, Rollers, Sand, Chip Spreaders, Sheepsfoot Rollers
Kohler—Generators, Lighting Plants
Le Roi—Air Compressors
Loschen—Hercules Red Strand Wire Rope
Michigan Power Shovel—Truck Cranes, Truck Shovels
P. & H.—Crawler Shovels, Crawler Cranes
Skilsaw—Elec. Hammer Drills, Saws
Syntron—Conc. Vibrators, Generators
Williams—Buckets

Clamshell and Dragline Buckets, Belting, Rubber Hose, Road Torches, Wheelbarrows, Scoops, Spades, Shovels, Tools, Supplies

Member: Associated Equipment Distributors

O. T. CHRISTERSON CO.

3900 So. Wabash Ave. Chicago, Ill.

Representing

BLAW-KNOX—Road Forms, Bins, Batchers, Finishing Machines, Buckets, Truck Mixers, Spreaders, Vibrators
C. H. & E.—Road Pumps, Saw Rigs, 2-Ton Rollers
CHICAGO PNEUMATIC TOOL CO.—Compressors, Air Tools, Hose
CLEVELAND—Subgraders, Straight Edges, Finishing Tools
GORMAN-RUPP—Self Priming Centrifugal Pumps, Road Pumps
INSLEY MFG. CO.—Cranes, Shovels, Wagons, Conc. Carts, Derricks, Concrete Buckets
KOEHRING—Mixers, Pavers, Cranes, Shovels, Dumpsters, Mud Jacks, Trail Dumps, Wheelers, Longitudinal Finisher
KWIK-MIX—Concrete and Bituminous Mixers
PARSONS—Trench Machines, Backfillers, Turbo Mixers

Concrete Carts, Wheelbarrows, Supplies

PATTEN TRACTOR & EQUIPMENT CO.

1056 N. Kolmar Ave. Chicago, Illinois

Representing:

Athey Truss Wheel Co.
Caterpillar Tractor Co.
Killefer Mfg. Corp.
LaPlante-Choate Mfg. Co.
R. G. LeTourneau, Inc.
Trackson Company
Willamette Hyster Co.

EXPERT REPAIR SERVICE—COMPLETE SHOP FACILITIES

Member: Associated Equipment Distributors

GENERAL CONSTRUCTION EQUIPMENT CORP.

5040 So. Halsted St., Chicago, Ill.

Representing

Aeroil Burner Co.
Advance Machine Co., Inc.
American Saw Mill Machinery Co.
Atlas Conveyor Co.
Cleveland Formgrader Co.
Construction Machinery Co.—Concrete, Mortar, Bituminous Mixers: Pumps, Saws, Bins & Batchers, Wheelbarrows, Carts, Hoists
Electric Tamper & Equipment Co.—Gasoline, Electric Vibrators, Power Plants
Everhot Mfg. Co.
R. G. Haskins Co.
Kelley Electric Machine Co.—Electric & Gasoline Compactor Power Floats
Sangen Derrick Co.
Skilsaw, Inc.
Winslow Gov't Standard Scale Works — Wheelbarrow, Truck Scales

Also complete line of contractors' supplies, including hose, wire rope, tarpaulins, salamanders

Member: Associated Equipment Distributors

PEORIA TRACTOR & EQUIPMENT CO.

400 Franklin Street Peoria, Illinois

Representing

Athey Truss Wheel Co.
Caterpillar Tractor Co.
Killefer Mfg. Corp.
LaPlant-Choate Mfg. Co.
R. G. LeTourneau, Inc.
Thew Shovel Co.
Trackson Co.
Willamette Hyster Co.
Universal Crusher Company

Telephone 6177

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

Representing

ATHEY TRUSS—Wagons, Bulldozers
BUFFALO-SPRINGFIELD—Rollers
"CATERPILLAR"—Road Machinery
"CATERPILLAR"—Tractors
CHAIN BELT CO.—Mixers, Pumps
DIAMOND—Crushers, Screens
LAPLANT-CHOATE—Wagons, Scrapers, Bulldozers
LE TOURNEAU—Scrapers, Buggies, Bulldozers
OWEN—Clamshell Buckets
PAGE—Dragline Buckets
SAUERMAN—Cableways, Power Scrapers
SULLIVAN MACHY.—Air Compressors
THEW—Shovels, Draglines
TRACKSON—Traxcavators, Pipe Layers
WHITE—Vibrators, Tar Kettles

Member: Associated Equipment Distributors

GIERKE-ROBINSON CO.

4th & Ripley Sts. Davenport, Iowa

Representing

BARCO—Gasoline Hammers
BLAW-KNOX—Steel Road, Curb and Gutter Forms, Bins, Batchers, Clamshell Buckets, Truck Turntables, Grd Concrete Road Finishers
CHAIN BELT—Mixers, Pavers, Pumps, Elevators
CLYDE—Gasoline and Steam Hoists, Derricks
LITTLEFORD—Heaters, Kettles, Bituminous Distributors
SULLIVAN—Air Compressors, Tools
TRACKSON—Crawlers, Shovels and Bulldozers
THEW-LORAIN—Cranes, Shovels, Draglines
TIMKEN—Detachable Rock Bits, Steels
UNIVERSAL—Truck Cranes
UNIVERSAL—Form Clamps
WHITE—Vibrators

Member: Associated Equipment Distributors

CONSTRUCTION MACHINERY CORP.

Shreveport Louisiana

Representing

Bethlehem—Wire Rope
Chain Belt—Moto-mixers, Conc. Mixers, Pumpcrete, Pumps
C. H. & E.—Hoisting Engines, Piston Pumps, Saw Rigs
Chicago Pneumatic—Air Compressors, Paving Breakers, Riveting Hammers, Air Hoists, Grinders
Cletrac—Tractors
Galion—Motor Graders, Rollers, Blade Graders
General—Wheelbarrows, Grader Blades
W. E. Grace—Sweepers, Road Brooms
Heil—Bulldozers, Scrapers
Heltzel—Road Forms, Bins, Batchers
Hendrix—Dragline Buckets
Hercules Motors—Natural Gas, Diesel, Gasoline Engines
Little'ford Bros.—Asphalt Kettles, Distributors
Mall Tool—Vibrators
Murphy Diesel—Engines
Northwest—Shovels, Cranes, Draglines, Pullshovels
Page—Dragline Buckets
Skilsaw—Electric Handsaws, Drills
Gordon Smith—Ford Engine Air Compressors
Toledo—Torches, Steel Horses
Universal—Form Clamps

Bar Ties, Tighteners

Member: Associated Equipment Distributors

FLETCHER EQUIP. & SUPPLIES

309 Magazine Street New Orleans, La.

American Mfg. Co.
Bethlehem Steel Co.
Bates Valve Bag Corp.
Clyde Iron Works, Inc.
Diamond Iron Works
Gardner-Denver Co.
The Gorman-Rupp Co.
Insley Mfg. Co.
The Jaeger Machine Co.
Jones Superior Machine Co.
C. S. Johnson Co.
Koehring Co.
Kwik-Mix Mixer Co.
Littleford Bros.
M & M Wire Clamp Co.
Mall Tool Co.
Owen Bucket Co.
Parsons Co.
Page Engineering Co.
Jos. G. Pollard Co.
Sangen Derrick Co.
Sauerman Bros., Inc.
Sterling Wheelbarrow Co.
Toledo Pressed Steel Co.
Templeton, Kenly & Co., Inc.
Van Dorn Iron Works Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

ALBAN TRACTOR CO., INC.

725-27 East 25th St. Baltimore, Md.

Representing

CATERPILLAR TRACTORS AND ROAD MACHINERY

ATHEY TRUSS WHEEL CO.,
JOHN DEERE Industrial and Agricultural Equipment
GARDNER-DENVER CO.
GENERAL EXCAVATOR CO.
HERCULES ROLLER CO.
"INVADER" SHOVELS
KILLEFER MFG. CORP.
LaPLANT-CHOATE MFG. CO.
OSGOOD CO. Shovels, Cranes, Draglines
PIONEER ENGRG. WKS., INC.
R. G. LeTOURNEAU, INC.
ROGERS BROS. CORP.
WILLAMETTE HYSTER CO.
WM. BROS BOILER MFG. CO.

CATERPILLAR DIESEL AND GAS POWER UNITS

Member: Associated Equipment Distributors

D. C. ELPHINSTONE, INC.

115 S. Calvert St. Baltimore, Md.
1203 Nat'l Press Bldg., Washington, D. C.

Representing

E. D. Etnyre & Co.
Electric Tamper & Equip. Co.
Emerson Pump & Valve Co.
Goodall Rubber Co.
Gorman-Rupp Company
Hauck Mfg. Co.
H. K. Porter Co.
Hough-Universal Buckeyes
Huber Mfg. Co.
Insley Mfg. Co.
C. S. Johnson Co.
Koehring Co.
Kwik-Mix Co.
LaBour Co., Inc.
Lambert-National Hoists
Linn Mfg. Corp.
McKiernan-Terry Corp.
Minwax Co.
Owen Bucket Co.
Parsons Co.
Reed-Prentice Corp.
Sauerman Bros. Inc.
Syntron Co.
Truscon Steel Co.
Worthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

JOHN C. LOUIS COMPANY

INCORPORATED

511 W. Pratt St. Baltimore, Md.
4821 Bethesda Ave. Bethesda, Md.

Representing

AMERICAN CABLE—Truflay Wire Rope
BUTLER—Bins
CENTAUR—Road Mowers
CLEVELAND—Paving Breakers, Sinker Drills
GALION—Leaning - Wheel Graders
GENERAL—Wheelbarrows
GOOD ROADS—Crushers, Snow Plows
JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.
JONES—Saw Rigs
LAKEWOOD—Finishers, Forms, Towers
LeROI—Air Compressors
LITTLEFORD—Asphalt Heater, Distributors
MALL—Conc. Vibrators
TIMKEN—Detachable Rock Bits
WHEELING—Corrugated Culvert Pipe

Member: Associated Equipment Distributors

McCLUNG-LOGAN EQUIPMENT CO., INC.

Key Highway & McComas St., Baltimore, Md.

Sales—Service—Rentals

Allis-Chalmers—Tractors, Graders, Power Units
Baker—Scrapers, Bulldozers, Trailbuilders, Snow Plows
Buckeye—Finegraders, Spreaders, Ditchers, Backfillers, Shovels, Cranes
C. H. & E.—Saw Rigs
Chain Belt (Rex)—Mixers, Pavers, Pumps, Pumpcrete
Chicago Pneumatic—Compressors, Drills, Breakers, Pneumatic and Electric Tools
Cleveland—Formgrader, Form Tampers
Euclid—Wagons, Bulldozers
Gar Wood—Sweepers, Bulldozers, Trailbuilders
Grace—Road Sweepers
Haiss—Loaders, Conveyors, Buckets
Hough—Shovels
Iowa—Quarry Sand & Gravel Equipment, Black Top Plants
Jones & Laughlin—Gilmore Wire Rope
Northwest—Shovels, Cranes, Draglines
Page—Dragline Buckets
Wiley—Whirleys, Steel Barges, Conc. Buckets, etc.

Curing Materials, Hunt Process Ritecure
Member: Associated Equipment Distributors

THE HENRY H. MEYER CO., INC.

110 S. Howard St., Baltimore, Md.
1133 13th St., N.W., Washington, D.C.

Representing

Barber-Greene Co.
Bay City Shovels, Inc.
Blaw-Knox Co.
Boston & Lockport Bl. Co.
Columbus Conveyor Co.
Connery & Co., Inc.
Dobbie Fory. & Mach. Co.
Domestic Eng. & Pump Co.
Duff-Norton Mfg. Co.
Harrington Co.
Ingersoll-Rand Co.
Jackson Mfg. Co.
Johns-Manville
A. Leschen & Sons Rope Co.
Lidgerwood Mfg. Co.
Lima Locomotive Works
Master Vibrator Co.
Novo Engine Co.
Richmond Screw Anchor Co.
Shaw Bx. C. A. Hoist Div.
Sterling Wheelbarrow Co.
Templeton, Kenly & Co.
Union Iron Works, Inc.
Universal Road Machy. Co.

Member: Associated Equipment Distributors

CLARK-WILCOX COMPANY

118 Western Ave. Boston, Mass.

Representing

ALLIS-CHALMERS—Tractors
ATLAS—Powder, Blasting Equipment
BAKER—Bulldozers
BEEBE BROS.—Hoists
BLYSTONE—Mortar Mixers
BUCYRUS-ERIE—Cranes, Shovels, Draglines
BURCH—Ross Plows, Road Machinery
CLEVELAND—Formgraders
C. R. JAHN CO.—Trailers
GARDNER-DENVER—Air Compressors
HAISS—Elevators, Conveyors and Loaders
HAUCK—Oil Burners and Heaters
HAZARD—Wire Rope, Cable
HELTZEL—Bins and Forms
HOMESTEAD—Hypressure Jenny Cleaner
MARLOW—Self-Priming Pumps
MASTER—Vibrators
PIONEER—Crushers, Gravel Plants
RANSOME—Concrete Mixers, Chuting Equip.
GAR WOOD—Scrapers, Sheepsfoot Rollers

Member: Associated Equipment Distributors

HEDGE & MATTHEIS CO.

285 DORCHESTER AVE. BOSTON, MASS.

Boston, Springfield, Worcester, Mass.; Portland, Bangor, Me.; Hartford, New Haven, Conn.; Concord, N. H.; Bellows Falls, Vt.; Providence, R. I.

Aeroil Burner Co., Inc.
Burch Corp.
Byers Machine Co.
Concrete Surfacing Machy. Co.
Electric Tamper & Eq. Co.
Four-Wheel Drive Auto Co.
Frink, Carl H.
Hercules Motors Corp.
Ingersoll-Rand Co.
Jaeger Machine Co.
Jones Superior Machine Co.
Joseph F. Kiesler Co.
A. Leschen & Sons Rope Co.
Linn Manufacturing Corp.
McKiernan-Terry Corp., and Lambert-Nat'l Hoist Div.
N. P. Nelson Iron Wks., Inc.
Owen Bucket Co.
Page Engineering Co.
Red Star Products Co.
W. A. Riddell Corp.
Rogers Bros. Corp.
Rome Grader & Machinery Corp.
Sangen Derrick Co.
Sauerman Bros. Inc.
Syntron Co.
Toledo Pressed Steel Co.
Universal Crusher Co.
Universal Form Clamp Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

PARKER, DANNER COMPANY

817 Albany St., Boston, Mass.

Representing

Barco—Gasoline Hammers
Beach—Saw Tables
Broderick & Bascom—Wire Rope
Clyde—Hoists, Derricks, Whirleys, etc.
Gorman-Rupp—Pumps, etc.
Harrington—Chain Hoists
Insley—Shovels, Cranes, Wagons, Buckets & Trailers
Jackson—Wheelbarrows & Concrete Carts
Johnson—Bins, Batchers & Wheelbarrow Scales, etc.
Koehring—Shovels, Cranes, Pavers, Mixers, Dumpsters, Traildumps, Wheelers, Longitudinal Finishers, Modjacks
Kwik-Mix—Concrete Mixers Mortar & Plaster & Bituminous Mixers
Master—Vibrators, Generators, etc.
Page—Dragline Buckets
Parsons—Trenchers, Backfillers
Sangen—Derricks, Winches, etc.
Sullivan—Compressors, Rotators, Paving Breakers, etc.
Timken—Rock Bits
Union—Pile Hammers, etc.

Also small tools, etc.

Member: Associated Equipment Distributors

W. H. ANDERSON CO., INC.

47 W. Seven Mile Rd., Detroit, Mich.

Phone: TOwnsend 9-5400

(Exclusive)
American Cable Wire Rope
Buffalo-Springfield Rollers
Cleveland Trencher Ditchers, Cranes
Euclid Bottom Dump & Rear Dump Dirt Handling Trucks
Grand Specialties C Clamps
Haiss Loaders
Iowa—Asphalt, Gravel, Rock Plants, Crushers, Conveyors, Bins, etc.
C. S. Johnson Batchers, Bins, etc.
Knickerbocker Conc. Mixers
Linn Track Trucks
Metal Forms Steel Rd. Forms, Curb, Silo, Wall Forms, etc.
Municipal St. Sweepers, Flushers, etc.
Novo Engines, Pumps, Hoists, etc.
Thew—Cranes, Shovels, etc.
Wellman Engrg. Buckets
Whiteman Precision Floor Finisher (Gas. or Elec.)
Worthington Pumps Compressors, Pneumatic Tools (Non-exclusive)
Page Engrg. Dragline Buckets
Sangen Derrick Pole Derricks
Sterling Wheelbarrows, Concrete Carts

Member: Associated Equipment Distributors

R. G. MOELLER COMPANY

14415 Meyers Rd., Detroit, Mich.

Representing

Bay City Shovels, Inc.
Bethlehem Steel Co.
C. H. & E. Mfg. Co.
The Unistrut Corp.
Drave Corp.
Flexible Road Joint Machine Co.
Heltzel Steel Form & Iron Co.
Hercules Motors Corp.
Homestead Valve Mfg. Co.
Ingersoll-Rand Co.
Jos. F. Kiesler Co.
Le Roi Co.
Lincoln-Schlueter Floor Machy. Co.
Link-Belt-Speeder Corp.
McKiernan-Terry Corp. and Lambert-Nat'l Hoist Div.
Milwaukee Elec. Tool Co.
Sangen Derrick Co.
Slusser-McLean Scraper Co.
Smith Engrg. Works
Smith Co., T. L.
Sterling Wheelbarrow Co.
Templeton-Kenly Co.
Toledo Wheelbarrow Co.
Tri-Lok Co.
Waukesha Motor Co.
White Mfg. Co.
Wisconsin Motor Corp.

Member: Associated Equipment Distributors

THORMAN W. ROSHOLT CO.

3138 Snelling Ave. Minneapolis, Minn.

Representing

ADAMS Power Grader
BAILY Concrete Vibrator
BARCO Hammers
BEACH Saws
"BERG" Concrete Surfacer
BUCYRUS-ERIE Scrapers and Bulldozers
BUFFALO-SPRINGFIELD Rollers
CHICAGO PNEUMATIC Compressors and Tools
CLEAVER-BROOKS Boilers
CORRUGATED Steel Sheet Piling
GORMAN-RUPP Pumps
INSLEY Shovels & Cranes
INTERNATIONAL Indus. Tractors
IOWA "Cedar Rapids" Crusher Plants and Equip.
JOHNSON Batchers and Demountable Bins
KWIK-MIX Mixers
KOEHRING Pavers, Mixers, Cranes, Dumptor, Mud-Jacks, Shovels
LIDGERWOOD Hoists
METAL FORMS CORP. Forms
MURPHY Diesels
OWEN Buckets
RAMSEY Hoists, Winches
ROSCO Trailers and Bituminous Distributors
SARGENT Snow Plows
"SNOGO" Rotary Snow Plow
SUPERIOR Form Clamps
TRACKSON Loaders and Cranes
UNION IRON WORKS
VULCAN Steam and Gas Locomotives

Member: Associated Equipment Distributors

WM. H. ZIEGLER CO., INC.

Minneapolis, St. Paul, Duluth, Crookston, Minn.

ATHEY—Crawlers, Dump Wagons, Trailers
BARBER-GREENE — Conveyors, Loaders, Ditchers
BUCYRUS-ERIE — Power Shovels, Cranes, Draglines
BUTLER—Bins, Batchers
"CATERPILLAR" — Tractors, Engines, Road Machinery
DAVENPORT - BESLER—Locomotives, Snow Plows
FOUR WHEEL DRIVE AUTO CO.—Trucks
FRINK—Snow Plows
GARDNER-DENVER—Air Compressors, Drills
HOMESTEAD—Hypressure Jenny Spray Cleaners
KILLEFER—Road Rippers, Scrapers
LaPLANT-CHOATE—Bulldozers, Snow Plows, Dump Wagons
LESCHEN—Wire Rope
LeTOURNEAU—Dirt Moving Equipment
LITTLEFORD — Oil Distributors, Tar Kettles, Heaters
MADSEN—Asphalt Plants
PIONEER—Crushers, Gravel Plants
REX—Mixers, Pavers, Mote-Mixers, Pumps
"WILLIAMS"—Buckets

Member: Associated Equipment Distributors

O. B. AVERY COMPANY

1325 Macklind Avenue St. Louis, Mo.

Exclusive Distributors of

AMERICAN Hoists & Derricks
AUSTIN-WESTERN Graders, Rollers, Sweepers, Scrapers, Crushers
BARCO Hammers
BLAW-KNOX Bins, Buckets, Finishers, Forms
BRODERICK & BASCOM Wire Rope
BURCH Spreaders, Snow Plows
CHAIN BELT Mixers, Pavers, Pumps
CLEVELAND Air Tools
CLEVELAND Trenchers
DEMPSTER Dumpsters
LITTLEFORD Distributors, Tar Kettles
MASTER Vibrators, Generators
McKIERNAN-TERRY Pile Hammers
NORTHWEST Shovels, Cranes & Draglines
R-B Subgraders
SCHRAMM Compressors
VULCAN Locomotives

Member: Associated Equipment Distributors

CORBY SUPPLY COMPANY

3942-46 W. Pine Blvd., St. Louis, Mo.

Representing

AMERICAN—Flexible Metal Hose
BUHL CO.—Portable Air Compressors
CHAMPION RIVET CO.—Rivets and Welding Rod
DETROIT HOIST & MACH. CO.—Air and Electric Hoists
DeVILBISS CO.—Paint Spray Equipment
HARDSOCG WONDER DRILL CO.—Rock Drills and Paving Breakers
WM. H. KELLER, INC.—Super Pneumatic Tools
MUNSELL—Air-Operated Concrete Vibrators
PANGBORN CORP.—Sandblast Equipment
PENN'SYLVANIA—Air Compressors and Pumps
DAVID ROUND & SON—Chain Hoists
STAYNEW—Air and Pipeline Filters
N. A. STRAND & CO.—Flexible Shaft Equipment
VAN DORN—Electric Drills, Grinders and Buffers
VICTOR—Welding and Cutting Apparatus
WESTINGHOUSE—Arc Welding Equipment
GUSTAV WIEDEKE CO.—Tube Expanders

JOSEPH KESL RENTAL EQUIPMENT CO.

4922 North B'way St. Louis, Mo.

Shop & Yard: 5515 Bulwer Ave., St. Louis, Mo.

(We rent construction equipment of all kinds)

Air Compressors
Blade Graders
Bulldozers, Backfillers
Concrete Mixers
Crawler Wagons, Trastors
Elevating Graders
Hoists
Hydraulic Scrapers
Motor Graders
Pumps
Rock Crushers
Rollers
Rotary Scrapers
Sand, Gravel Eq.
Shovels and Draglines
Wheel Tractors

Member: Associated Equipment Distributors

C. F. RABBEITT, INC.

1523 N. Broadway St. Louis, Mo.

Representing

Baily Vibrator Co.
Cleveland Formgrader Co.
Cleaver-Brooks Co.
Concrete Surfacing Machy. Co.
Drave-Doyle Co.
Fairbanks, Morse & Co.
Good Roads Machinery Corp.
Heltzel Steel Form & Iron Co.
Frank G. Hough Co.
Huber Mfg. Co.
Insley Mfg. Co.
Koehring Co.
Kwik-Mix Concrete Mixer Co.
Lidgerwood Mfg. Co.
Northern Conveyor Co.
Parsons Co.
Rosco Mfg. Co.
Sterling Machinery Corp.
Sterling Wheelbarrow Co.

Member: Associated Equipment Distributors

THE GEO. F. SMITH CO., INC.

Franklin & Channing Aves., St. Louis, Mo.

Complete Plants Rented

American Fork & Hoe—Shovels, Hand
Archer—Fastener Equipment
Bemis—Tarpaulins, Burlap
Blackhawk—Jacks
Blystone—Mortar Mixers
Cleveland Formgrader—Rd. Eq.
Cleveland Rock Drill—Air Tools
Clyde—Hoists, Derricks
Conc. Surfacing Mach.—Elec. Rubbing Stones
Continental—Hose
Devery—Compressors
Edwards—Bar Shears
Everhot—Branding Irons
Fairbanks, Morse—Scales
Hauck—Heaters, Tar Kettles
Hinman—Bar Benders
Kelley—Power Floats
Leschen—Rope
Link-Belt—Speed-o-Matic Shovels, Cranes, Draglines
Mall—Vibrators, Grinders, Saws, Drills
Novo—Pumps
Owen—Clamshell Buckets
Page—Buckets
Red Star—Wheelbarrows
Sangen—Derricks, Winches
Scheu—Salamanders
Silent Hoist—Power Winches
Skelton—Shovels, Hand
Smith, T. L.—Mixers, Truck-mixers
Symonds—Column Clamps
Templeton, Kenly—Trench Braces, Jacks
Universal—Form Clamps
Vulcan—Hammers
Whiteman—Conc. Surfacers
Wiley—Concrete Buckets

Member: Associated Equipment Distributors

TRACTOR & EQUIPMENT CO.

Sidney Montana

Representing

Caterpillar Tractor Co.
Athey Truss Wheel Co.
The Baldersen Mfg. Co.
Cardwell Mfg. Co., Inc.
Killefer Mfg. Corp.
Le Plante-Choate Mfg. Co.
A. Leschen & Sons Rope Co.
R. G. LeTourneau, Inc.
Pioneer Engineering Works, Inc.
Ritchie Mfg. Co.
Trackson Co.
Wellman Engineering Co.
Willamette Hyster Co.

Member: Associated Equipment Distributors

DALE & RANKIN, INC.

113 Frelinghuysen Ave., Newark, N. J.

Representing

AEROIL Heaters and Tools
ALEMITE Guns and Fittings
CHAMPION Sewer Cleaning Machines
HELTZEL Road Forms and Bins
INGERSOLL-RAND Compressors and Tools
JACKSON Wheelbarrows
REX Mixers and Pavers
REX Pumps
RICHMOND SCREW ANCHOR Concrete Accessories
VIBER Elec. & Pneu. Concrete Vibrators
WALKER-TURNER Radial Saws
WALSH Snow Plows
WINSLOW Scales

Member: Associated Equipment Distributors

JOHNSON & DEALAMAN, INC.

255 South Street Newark, N. J.

Representing

Allis-Chalmers Tractors, Graders, Power Units
American Snow Plows, Hoists, Derricks, Sheaves
American Cable Trusdy & Crescent Wire Rope
Baily Vibrators
Baker Bulldozers, Gradebuilders, Scrapers, Rd. Equip.
C. H. & E., Saw Tables & Hoists
Cleveland Pneumatic Tools
Gar-Wood—Continental Scrapers, Bulldozers, Rd. Equip.
Hauck Concrete & Water Heaters, Oil Burning Equip.
Hotchkiss Road, Sidewalk & Concrete Forms
Hough Hydraulic Loaders, Sweepers & Allied Tractor Attachments
Jackson Wheelbarrows, Conc. Carts, Salamanders, etc.
Johnson Steel Bins, Batchers, Scales
La Crosse Trailers
Marlow Centrifugal, Diaphragm & Plunger Pumps
Nelson Bucket & Snow Loaders
P & H Shovels, Cranes
Ransome Pavers, Mixers, Truck Mixers, Conc. Carts, Chuting Equipment
Red Star Wheelbarrows, Batch Boxes, Conc. Carts, Column Clamps & Adjustable Shores
Sullivan Air Compressors & Tools

Shovels, Cranes, Trailers, Rollers, etc.

Member: Associated Equipment Distributors

LLOYD G. ROSS

3090 Main St. Buffalo, N. Y.

Representing

Allis-Chalmers Mfg. Co.
Burch Spreaders
Coleman Trucks
General Excavator Co.
Hercules Roller Co.
Quick-Way Truck Shovels
Ross Snow Plows
Smith Mixers

Sale and Rent of All Kinds of Construction Equipment

RUPP EQUIPMENT CO.

101 Great Arrow Ave., Buffalo, N.Y.

Representing

Aeroil Burner Co., Inc.
Atlas Conveyor Co.
Broderick & Bascom Rope Co.
Cleveland Rock Drill Co.
Cleveland Tractor Co.
Harnischfeger Corp.
Jaeger Machine Co.
C. S. Johnson Co.
Mall Tool Co.
Murphy Diesel Co.
Sasgen Derrick Co.
Schramm, Inc.
Sisalkraft Co.
Skilsaw, Inc.
Timken Rock Bits
Universal Motor Co.
Vulcan Iron Co.

Member: Associated Equipment Distributors

COMPLETE
Machinery & Equipment Co., Inc.

"Specialists in Pumps"

36-40 Eleventh St.
Long Island City New York

Representing

COMPLETE—Wellpoint Systems
INGERSOLL-RAND CO.—Air Compressors
KADCO CORP.—Dust Control Equipment
McKIERNAN-TERRY CORP.—Pile Hammers
MALL TOOL CO.—Concrete Vibrators, Chain Saws
MARLOW—Self-priming Centrifugal & Plunger Pumps
RENTAL SERVICE

Member: Associated Equipment Distributors

GEORGE MALVESE & CO.

New Hyde Park, N. Y.

Long Island Distributors:

ADAMS Graders
BRODERICK & BASCOM Wire Rope
CLETRAC Crawler Tractors
EUCLID Scrapers
LITTLEFORD Tar Kettles, Heaters, Distributors, etc.
LOCKE Power Mowers
OLIVER Implements
SARGENT Snow Plows
"SILVER KING" Tractors
WORTHINGTON Power Mowers

Also Pumps, Mixers

HODGE & HAMMOND, INC.

Construction Equipment

1162 Grinnell Place New York, N.Y.
Phone: DAytos 9-5360

Exclusive Distributors

ALLIS-CHALMERS Tractors and Graders
BAKER Bulldozers, Gradebuilders, Snow Plows
BARNES Diaphragm and Self-Priming Pumps
BUCKEYE Ditchers, Spreaders, Finegraders, Bulldozers
BUDA HUBRON Earth Drills
EASTMAN Hi-Pressure Hydraulic Hose
GARDNER-DENVER Compressors and Rock Drills
HAISS Clamshell Buckets
HOUGH Hydraulic Shovel Loaders
JAHN Heavy-Duty Trailers
MURPHY-DIESEL Engines, Power Units
NORTHWEST Shovels, Cranes, Draglines
PAGE Dragline Buckets
TIMKEN Rock Bits
GAR WOOD Scrapers, Rip Rooters, Bulldozers

Member: Associated Equipment Distributors

J. C. HOUSTON

50 Church Street New York, N.Y.

Representing

BROWNING CRANE & SHOVEL CO.
HOISTING MACHINERY CO.

Warehouse

ELIZABETH, N.J.—L.V.R.R.

HUBBARD & FLOYD, INC.

Construction Equipment

167th St. & Sedgwick Ave., New York, N. Y.
Telephone: JErome 7-8960

AUSTIN-WESTERN Sweepers, Graders, Rollers
EUCLID Trucks, Crawler Wagons, Tamping Rollers
KNICKERBOCKER Concrete and Mortar Mixers
LIMA Shovels, Cranes, Draglines, ¾ yd. to 3-yd. capacity.
ROGERS Heavy-Duty Trailers
THEW Shovels, Cranes, Backhoes, ⅜-¾-yd. capacity.
UNIVERSAL-LORAIN Moto-Cranes, Truckcranes
WICKWIRE-SPENCER Wire Rope
WILLIAMS Clamshell and Dragline Buckets
WORTHINGTON Portable Compressors, Air Tools

Member: Associated Equipment Distributors

MAHONEY-CLARKE, INC.

Complete Line of Contractors' Equipment and Supplies

217 Pearl Street New York, N. Y.

Representing

Beach and C. H. & E. Saw Tables
Blackhawk Hydr. Jacks and Equip.
Boston Woven Hose & Rubber Co. All types of Hose and Belting
Broderick & Bascom Wire Rope
Hinman Bar Benders and Edwards Bar Cutters
Hotchkiss Road & Sidewalk Forms
Ingersoll-Rand Compressors, Drills, Pneu. Tools, etc.
Kardong Bar Benders
Lansing Concrete, Mortar Mixers, Wheelbarrows & Carts
Master Gas & Elec. Conc. Vibrators
Master Gasoline Engine-Driven Generators
Richmond Tyscrus, Anchors
Sterling Pumps of all descriptions
Tuthill Hwy. Guard Rail, Hwy. Divider
Wiley Concrete Buckets
Yale Hoists & Put-Lifts
Rental Service

Member: Associated Equipment Distributors

R. E. BROOKS COMPANY

"Serving the Contractor for over 28 years"

50 Church Street New York, N.Y.

Blaw-Knox Co.—Road and Sidewalk Forms, Bins, Batchers, Finishing Machines, Buckets
Cleaver-Brooks Co.—Tank Car Heaters, Boosters
Cleveland Tractor Co.—Cletrac Tractors
Gorman-Rupp Co.—Pumps
Insley Mfg. Co.—Excavators, Concrete Chuting Plants, Buckets, Cars
Koehring Co.—Pavers, Mixers, Shovels, Cranes, Mud Jacks, Wheelers, Dumptors, Longitudinal Finishers
Kwik-Mix Mfg. Co.—Caner. Mixers
Parsons Co.—Trench Machines

Member: Associated Equipment Distributors

A. P. DIENST COMPANY

Contractors' Supplies

140th St. & 3rd Ave., New York, N. Y.

Distributors for

DIENST Blasting Mats
DUFF Sewer Trench Braces
GREDAG Grease
KEYSTONE Grease
LINCOLN Grease Guns
SIMPLEX Jacks
TOLEDO Bull Frog Wheelbarrows
WYOMING Red Edge Shovels
YALE Hoists

Telephone MOtt Haven 9-5430

THE GOOD ROADS MACHINERY CO. of NEW YORK, Inc.

50 Church St. New York, N.Y.

Representing

Centaur Co.
Galion Iron Wks. & Mfg. Co.
Good Roads Machy. Corp.
Georgia Hains Mfg. Co.
Kinzer Mfg. Co.
La Rol Co.
Penn Metal Corp.
Rogers Bros. Corp.
Thew Shovel Co.

Member: Associated Equipment Distributors

H. O. PENN MACHY. CO., INC.

140th St. & East River The Bronx, N. Y. C.

Branches

Mineola, L. I. Poughkeepsie, N. Y.

Representing

ATHEY TRUSS WHEEL CO.
BARCO Hammers
BEACH Saw Rigs
BUCYRUS - ERIE Shovels, Cranes, Draglines
CARDWELL Tractor Cranes
CATERPILLAR Tractors, Engines, Road Machy.
DEERE Indus. Tractors
FOOTE Pavers
FRINK Sno-Plows
HELTZEL Steel Bins, Forms
HIGHWAY Spreaders
HUBER Rollers
KILLEFER MFG. CO.
LaPLANT-CHOATE MFG. CO.
LeROI Compressors, Engines
LeTOURNEAU, Inc., R. G.
NOVO Pumps, Hoists
OWEN Buckets
SMITH Mixers
TRACKSON Traxcavators, Pipe Layers
WILLAMETTE HYSTER CO.

Warehouse Stock—Service Station

Member: Associated Equipment Distributors

UNITED HOISTING CO., INC.

165 Locust Avenue
NEW YORK, N.Y.

Representing

Concrete Equipment Manufacturers—Concrete Vibrators
Construction Machy. Co.—Concrete, Plaster & Mortar Mixers, Saw Rigs, Pumps, Hoists and Pneumatic Tired Concrete Carts
Independent Pneumatic Tool Co.—"Thor" Pneumatic Tools, Hand Saws, and Sump Pumps
Sterling Mfg. Co.—Wheelbarrows & Concrete Carts
Sullivan Machy. Co.—Compressors, Pneumatic Tools and Accessories

Member: Associated Equipment Distributors

THE SYRACUSE SUPPLY CO.

294 Ainsley Dr. Syracuse, N.Y.

CONSTRUCTION EQUIPMENT DIVISION

Syracuse—Rochester—Buffalo

Athey Truss Wheel Co.
Bethlehem Wire Rope
Caterpillar Tractor Co.
D-A Lubricant Co., Inc.
Gardner-Denver Co.
Goodyear Tire & Rubber Co.
Gravely Motor Plow & Cultivator Co.
Hauck Heaters
Highway Equipment Co.
Iowa Mfg. Co.
Jaeger Machine Co.
Killefer Mfg. Co.
LaCrosse Trailer & Equipment Co.
LaPlant-Choate Mfg. Co.
R. G. LeTourneau, Inc.
Link-Belt Speeder Corp.
Master Vibrator Co.
N. P. Nelson Iron Wks., Inc.
Timken Roller Bearing Service & Sales Co.—Timken Bits & Rods
Trackson Co.
Universal Form Clamp Co.
Willamette Hyster Co.

Member: Associated Equipment Distributors

T. L. PITTS AND SON

Charlotte, North Carolina

Representing

American Chain Link Fence—Wire Fencing
Barnes—Centrifugal, Diaphragm Pumps
Dorsey Brothers—Highway Trailers
Deister Machine—Vibrating Screens
Esseo—Electric Signal Equipment
Fate-Root-Heath—Highway Tractor Mowers
Marvel—Conc. Vibrators, Heating Kettles
Mine & Smelter Supply—Rock Bit Grinders
Shunk—Road Machines, Drag Blades
T. L. Smith—Concrete Mixers
Universal Road Machinery—Rock Crusher Equipment
Universal Power—Arc Welders, Accessories
Universal Motor—Light, Power Plants
Western Cataphote—Street, Highway Signs

NORTH CAROLINA EQ. CO.

Raleigh Statesville

Aeroil Burner Company
American Cable Division
Baroo Mfg. Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Tractor Eq.
Cleaver-Brooks Company
Electric Tamper & Eq. Co.
Elgin Corporation
Euclid Road Machy. Co.
Fairbanks, Morse & Co.
Fairfield Engrg. Co.
Four Wh. Dr. Auto Co.
Frank G. Hough Co.
Galion Allsteel Body Co.
Galion Iron Wks. & Mfg.
Murphy Diesel Co.
Good Roads Machy. Corp.
Heltzel Steel Form & Iron Company
Highway Trailer Co.
Ingersoll-Rand Company
Internat'l Harvester Co.
Iowa Manufacturing Co.
Jaeger Machine Company
Jeffrey Manufacturing Co.
Jos. F. Kiesler Company
Kensington Steel Company
Northwest Engineering Co.
Pape Engineering Company
Rogers Bros. Corp.
Rosco Mfg. Co.
The C. S. Johnson Co.
Wellman Engineering Co.

Member: Associated Equipment Distributors

CAROLINA TRACTOR & EQUIPMENT COMPANY

S. Main Ext. Salisbury, N. Car.

Branch Office and Warehouse: Raleigh, N. C.

ATHEY Track-wheel Wagons
BARBER-GREENE Loaders, Asphalt Plants, Finishers
BLAW-KNOX Steel Forms, Bins, Buckets, Trukmixers
CATERPILLAR Tractors, Graders, Power Units
C.M.C. Mixers, Pumps, Hoists
ETNYRE Bituminous Distributors, Flushers.
HUBER Rollers
JAHN Machinery Trailers
LaPLANT-CHOATE Wagons, Bulldozers
LeTOURNEAU Carry-all Scrapers
SLUSSER-McLEAN Wheelers, Rippers, Fresnos
SULLIVAN Air Compressors, Drills
THEW Shovels, Cranes
TRACKSON "Traxcavators"
UNIVERSAL Crushing Equipment

Member: Associated Equipment Distributors

THE CLETRAC OHIO SALES CO.

E. 193rd Street and Euclid Ave.
Cleveland Ohio

Representing

THE BAKER MFG. CO.—Power Scrapers
BUCKEYE TRACTION DITCHER CO.—Trailbuilders, Bulldozers
CENTAUR CO.—Highway Mowers
THE CLEVELAND TRACTOR CO.—Crawler Tractors, Front End Loaders
THE HEIL CO.—Power Scrapers, Bulldozers & Trailbuilders
THE ISAACSON IRON WORKS—Power Scrapers, Trailbuilders
MAIN STEEL, INC.—Snow Plows, Overhead Shovels
MEAD MORRISON—Winches
ROC COMPANY—Winches

W. T. WALSH EQUIPMENT CO.

3088 West 106th St., Cleveland, Ohio Tel. ORchard 4400

Allis-Chalmers—Tractors
Anthony—Dump Bodies
Atlas—Conveyors
Baker Mfg. Co.—Bulldozers
Brooks—Load Luggers
Buckeye—Ditchers
Bucyrus-Erie—Shovels, Cranes, Draglines
Buda—Gas & Diesel Power Units, Generator Sets
Caine—Corrugated Sheet Piling
Cleveland—Formgraders
Cleveland Rock Drill Co.—Air Tools
Complete—Wellpoint Systems
Construction Machy. Co.—Mixers
Hough—Tractor Front End Loaders
Jackson—Vibrators
LaCrosse—Trailers
LeRoi—Air Compressors, Engines
McKiernan-Terry Corp.—Pile Hammers
Michigan—Truck Shovels
Murphy-Diesel—Power Units, Generator Sets
Nelson—Bucket Loaders
Novo Engine Co.—Engines, Light Plants, Pumps
R-B Equipment Co.—Finegraders
Rosco Mfg. Co.—Distributors & Oilers
Timken—Bits
Wellman Engineering Co.—"Williams" Buckets
Gar Wood—Continental—Scrapers
Wm. Bros. Mfg. Co.—Tamping Rollers
Winslow—Scales

Member: Associated Equipment Distributors

SOUTHERN OHIO EQUIP. CO.

445 Woodlawn Ave., Zanesville, Ohio

Phone 1287

Distributors for

Allis-Chalmers Mfg. Co.
Austin Powder Co.
Baker Mfg. Co.
Bethlehem Steel Co.
Byers Machine Co.
Cleveland Rock Drill Co.
D-A Lubricant Co.
General Conveyor Co.
F. G. Hough Co.
Iowa Mfg. Co.
Paris Mfg. Co., Inc.
Schramm, Inc.
Shunk Mfg. Co.
Slusser-McLean Co.
Timken Roller Bearing Co.
Gar Wood Industries, Inc.

Member: Associated Equipment Distributors

LOOK THIS DIRECTORY OVER CAREFULLY

If you find any errors while checking over this directory will you please advise us, because it is our desire to keep it accurate and up to date at all times.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue New York

CLYDE EQUIPMENT CO.

Portland, Ore. Seattle, Wash.

Advance Car Mover Co.
Air-Way Pump & Equip. Co.
Atlas Imperial Diesel Eng. Co.
Barnes Mfg. Co.
Beebe Bros.
Bucyrus-Erie Co.
Buda Company
Clyde Iron Works, Inc.
Coming Hoist Co.
Concrete Surf. Machy. Co.
Dorco Corp.
Davenport Besler Corp.
Dixon Valve & Coupling Co.
Duff Norton Mfg. Co.
Geo. Haiss Mfg. Co., Inc.
Handlan Inc.
C. S. Johnson Co.
Kinzer Mfg. Co.
Kohler Co.
LeRoi Company
A. Leschen & Sons Rope Co.
The Linde Air Products Co.
Marvel Equipment Co.
M. P. McCaffrey, Inc.
Alexander Milburn Co.
Oshkosh Motor Tr. Mfg. Co.
Orton Crane & Shovel Co.
Owen Bucket Co.
Ramsey Machy. Co.
Red Star Products Inc.
Schoen Derrick Co.
Sauerman Brothers, Inc.
Skookum Co.
T. L. Smith Co.
Smith Engineering Works
Smith Welding Equip. Co.
Sterling Wheelbarrow Co.
Sullivan Machinery Co.
Templeton Kenly & Co., Inc.
Toledo Pressed Steel Co.
Union Fork & Hoe Co.
Van Dorn Iron Works Co.
Vulcan Iron Works
Wiley Machine Co., Inc.
Worthington Mower Co.

Member: Associated Equipment Distributors

LOGGERS & CONTRACTORS MACHINERY COMPANY

240 S.E. Clay St. Portland, Ore.

Representing

Archer Iron Works
Broderick & Bascom Rope Co.
Buckeye Traction Ditcher Co.
Butler Bin Co.
Chain Belt Co.
Diamond Iron Works
Euclid Road Machy. Co.
Garlinghouse Bros.
W. E. Grace Mfg. Co.
Harnischfeger Corp.
Hercules Motors Corp.
Ingersoll-Rand Co.
J. E. Ingram Equip. Co.
Kay-Brunner Steel Products Inc.
Metal Forms Corp.
Plymouth Locomotive Works
Ramsey Machy. Co.—Hoists
Vaper Blast Mfg. Co.
Woolridge Mfg. Co.

Member: Associated Equipment Distributors

A. R. AMOS, Jr.

713 Commercial Trust Bldg., Philadelphia, Pa.

Representing

Abbe Engineering Co.
Barber-Greene Co.
Beach-Russ Co.
Lecourtenay Co.
Sauerman Bros. Co.
Smith Engineering Works
Whitcomb Locomotive Co.
Yeomans Brothers Co.

COMLEY EQUIPMENT CO.

863 No. 28th St., Philadelphia

Representing

BROWNING CRANE & SHOVEL CO.—Rail and Wagon Cranes
MARLOW PUMPS—Centrifugal and Diaphragm Pumps
OWEN BUCKET CO.—Clamshell Buckets, Grapples
McCAFFREY-RUDDOCK CORP.—Rud-O-Matic Taglines.

Service and Parts
With facilities for complete repair jobs

EDELEN & BOYER COMPANY

Office and Warehouse 236 North 23rd St. Philadelphia Penna.

Distributors of

Adnun Stone Spreaders
Adnun Black Top Pavers
Aeroil Heaters, Melting Pots
Archer Towers, Buckets
Buckeye—Shovels, Cranes, Ditchers, Spreaders
CMC Master Mixers, Saw Rigs
CMC Self-Priming Pumps
Dempster—Dumpsters
Flex-Plane Finishing Machine
Hayward Clamshell Buckets
Heltzel Finishing Mach.
Heltzel Steel Forms, Bins
Jaekson Wheelbarrows, etc.
LaCrosse Tu-Way Trailers
Lidgerwood Hoists
Marsh-Capron Mixers
Miles Block Machines
Multi Foote Pavers
New Haven Burlapped-Cotton Blankets
Pulsometer Steam Pumps
R-B Finegrader
Sasgen Derricks, etc.
Sullivan Portable Air Comp.
Tru-lay Steel Cable
Union Pile Hammers
White Vibrators
Wonder Concrete Mixers

GILES & RANSOME

17th St. & Sedgley Ave., Philadelphia

Athey Truss Wheel Co.—Crawler Wagons
Barnes Mfg. Co.—Centrifugal Diaphragm and Force Pumps
Blaw-Knox Co.—Clamshell Buckets, Road Forms, Material and Cement Bins
"Caterpillar"—Tractors and Road Machinery
R. G. LeTourneau, Inc.—Carryalls, Buggies
LaPlant-Choate Mfg. Co. — Bulldozers, Trailbuilders, Carryalls, etc.
Master—Elec., Gas. Concrete Vibrators
Northwest Engineering Co.—Gasoline Cranes, Shovels and Draglines
Ord—Road Finishing Machine
Ransome Concrete Machinery Co.—Concrete Mixers and Appliances

Member: Associated Equipment Distributors

HOWARD W. READ CORP.

N. W. Cor. 25th and Wharton Sts., Philadelphia, Pa.

Distributors

Ralph B. Carter Co.
Insley Mfg. Co.
Koehring Co.
Quick-Way Truck Shovel Mfg. Co.
Vulcan Iron Works, Inc.—Pile Hammers

Also Carry in Stock:

Hoisting Engines, Gas and Steam

Member: Associated Equipment Distributors

SERVICE SUPPLY CORPORATION

20th and Venango Sts., Philadelphia, Pa.

Representing

Bay City Shovels, Inc.—Shovels, Cranes, etc.
Bomb Mfg. Co.—Saw Rigs
Chicago Pneumatic Tool Co.—Compressors, Air Tools
W. F. Hebard & Co.—Shop Mules
Hercules Company—Road Rollers
International Harvester Co.—Indus. Wheeltype and Crawler Tractors
Jaeger Machine Co.—Mixers, Truck Mixers, Pumps, Black Top Pavers, Finishing Machines
C. S. Johnson & Co.—Bins, Batchers, Cement Handl. Eq.
Lambert-National—Hoists
Littleford Bros.—Road Oil Distrs. Heating Kettles, etc.
McKiernan-Terry Corp.—Pile Hammers
S. P. Nelson Iron Wks., Inc.—Loaders & Belt Conveyors
The Parsons Company—Trench Machines, Snow Plows
Pioneer Engineering Wks., Inc.—Roll Crushers
Silent Hoist Winch & Crane Co.—Krane Kars, Winches, Capstans, Car Pullers, etc.

Member: Associated Equipment Distributors

J. JACOB SHANNON & CO.

1744—Sedgley Avenue—1744

PHILADELPHIA

Representing

Burch Corp.—Snow Plows, Maintainers
C. H. & E. Mfg. Co.—Saw Rigs, Rollers, Hoists
Clyde Iron Wks., Inc.—Gas, Elec., Steam Hoists
Concrete Surfacing Machinery Co.—Berg Surfacers
Electric Tamper & Equipment Co.—"Jackson" Vibrators
Emick Machy. Co.—Plaster Mixers
Gardner-Denver Co.—Air Compressors
Gibson Brothers Co.—Conc. Mixers
Huber Mfg. Co.—Road Rollers
Jay Mfg. Co.—Snow Loaders
Lull-Belt Speed-o-Matic Shovels, Cranes, Draglines
Richmond Screw Anchor Co.—Form ties
W. A. Riddell Corp.—Road Graders
John A. Roebling's Sons Co.—Wire Rope, Fittings
Sasgen Derrick Co.—Derricks and Winches
Shannon—Derricks and Derrick Fittings
Sterling Machy. Corp.—Pumps, Hoists, Generators
Van Dorn Iron Works Co.—Sweepers

Member: Associated Equipment Distributors

NIXON-HASSELLE COMPANY, INC.

Contractors' Equipment

Chattanooga Tennessee

Representing

Archer Towers, Spouting Equipment
Austin-Western Graders, Crushers, Rollers, Scrapers, etc.
Blaw-Knox Batchers, Buckets, Forms, etc.
Bros Tank Car Heaters, etc.
Bucyrus-Erie Bullgraders, Scrapers, etc.
Four Wheel Drive Trucks
Haiss Loaders, Conveyors, etc.
Hough Road Sweepers, Sprinklers, etc.
Murphy Diesel Engines
Ingersoll-Rand Compressors, Jackhammers, Air Tools, etc.
International TracTracTors, Wheel Tractors & Power Units
Jahn Machinery Trailers
Lidgerwood Hoists, etc.
Macleod Asphalt Kettles
Mall Vibrating Equipment, Saws, etc.
Newport Culvert Pipe
Northwest Cranes, Shovels
Rex Mixers, Pavers, Pumps, etc.
Sasgen Derricks, etc.
Timken Detachable Bits
Vulcan Gas Locomotives

Member: Associated Equipment Distributors

BROOKS EQUIP. & MFG. CO.

Knoxville 408 Davenport Rd. Tennessee

Representing

J. D. Adams Co.
Buckeye Traction Ditcher Co.
Bucyrus-Erie Co.
Cleveland Rock Drill Co.
Columbus Conveyor Co.
Construction Machy. Corp.
Davey Compressor Co.
Electric Tamper & Equip. Co.
Euclid Road Machy. Co.
Geo. Haiss Mfg. Co.
Heltzel Steel Form & Iron Co.
Hercules Co.
Hew Accessories Co.
Frank G. Hough Co.
Hughes-Keenan Co.
International Harvester Co.
Linn Mfg. Corp.
Manhattan Rubber Mfg. Div.
Municipal Supply Co.
H. P. Nelson Iron Wks.
Pioneer Engrg. Wks., Inc.
Rosco Mfg. Co.
Sasgen Derrick Co.
Silent Hoist Winch & Crane Co.
Tulsa Winch Co.
Union Wire Rope Co.

Member: Associated Equipment Distributors

OSBORNE EQUIPMENT COMPANY

525 State Street, Knoxville, Tennessee

Distributors for

American Cable Div., American Chain & Cable Co.
Ariens Co.
Boston Woven Hose & Rubber Co.
Buckeye Traction Ditcher Co.
J. I. Case Co. (Industrial)
Cleveland Tractor Co.
Davenport Besler Corp.
DeSoto Foundry Inc.
Galion Iron Wks. & Mfg. Co.
Gardner-Denver Co.
Heil Co.
Hobart Bros. Co.
Hug Co.
Iowa Mfg. Co.
Jaeger Machine Co.
Jeffrey Mfg. Co.
C. S. Johnson Co.
Kato Engineering Co.
Murphy-Diesel Co.
Northwest Engrg. Co.
Owen Bucket Co.
Pomona Pump Co.
Sasgen Derrick Co.
Silent Hoist Winch & Crane Co.
Skilsaw, Inc.
T. L. Smith Co., (Tilting Mixers)
Standard Steel Works
Toledo Pressed Steel Co.

Member: Associated Equipment Distributors

ROAD BUILDERS EQUIPMENT CO.

Third & Calhoun, Memphis, Tenn.

Representing

J. D. Adams Co.
Buda Co. (earth drills only)
Bucyrus-Erie Co.
Burch Corp.
Construction Machinery Co.
Hercules Co.
W. F. Hebard Co.
Frank G. Hough Co.
International Harvester Co.
Standard Steel Works
Union Wire Rope Corp.
Wellman Engineering Co.

Member: Associated Equipment Distributors

WILSON-WEESNER-WILKINSON CO.

Nashville Tennessee

Representing

Allis-Chalmers Mfg. Co.
Amer. Baldwin Wyoming Co.
Baker Mfg. Co.
Barber Greene Co.
Blaw-Knox Co.
Cleaver-Brooks Co.
Clyde Iron Works, Inc.
E. D. Etnyre Co., Inc.
Gorman-Rupp Co.
Ingersoll-Rand Co.
Insley Mfg. Co.
Koehring Co.
Littleford Bros.
Master Vibrator Co.
The Parsons Co.
Smith Engineering Works
Gar Wood Indus., Inc.

NASHVILLE—KNOXVILLE

Warehouse Stocks of Service

Reinforcing Steel and Mesh

Member: Associated Equipment Distributors

BROWNING-FERRIS MACHY. CO.

205 Exposition Ave. Dallas, Texas
Texas at Rice Sts. Houston, Texas

Representing

Cleveland Trencher Co.
Foote Company—Pavers
Galion Iron Works & Mfg. Co.
Bucyrus-Erie—Scrapers, Bulldozers
Ingersoll-Rand Company
International—Tractors
Iowa Mfg. Co.—Cedar Rapids Line
Jaeger Machine Company
Jones Superior Mach. Co.
Littleford Brothers
The Owen Bucket Company
Page Engineering Co.
Sterling Wheelbarrow Co.
Thew Shovel Company
Trackson Company

Member: Associated Equipment Distributors

R. B. EVERETT & CO.

3112-18 Harrisburg Blvd. Houston, Texas

BLAW-KNOX Road Plant Equipment, Bins, Clamshell Buckets
AMERICAN Hoisting Machinery
"P. & H." Gasoline Cranes
McKIERNAN-TERRY Pile Hammers, etc.
CONNERY Asphalt Equip.
CHAIN BELT Concrete Mixers, Saw Rigs, Pavers
NOVO Engines, Hoists, Pumps
"RED STAR" Wheelbarrows
SAUERMAN Cableways
BATES Wire Ties
PULSOMETER & NYE Steam Pumps
PATENT Safety Swinging Scaffolding
TRU-LAY Wire Rope
BUFFALO-SPRINGFIELD Road Builders
SULLIVAN Compressors
PORTABLE Conveyors
ETNYRE Asphalt Distrs.
FLYNN Surgrader
PAGE Dragline Buckets
MALL Vibrators

Member: Associated Equipment Distributors

J. E. INGRAM EQUIP. CO.

1146 West Laurel St. San Antonio, Texas

Representing

Barber-Greene Co.
Buckeye Traction Ditcher Co.
Buda Co.
Chain Belt Co.
DeSoto Foundry Co.
Durex Mfg. Co.
Etnyre & Co., E. D.
Ingram Rollers
Mall Tool Co.
Murphy-Diesel Co.
Northwest Engrg. Co.
Owen Bucket Co.
Simplicity Engrg. Co.
Sullivan Machy. Co.
Whiteman Mfg. Co.

Member: Associated Equipment Distributors

A. L. GUILLE

825 Wainwright Bldg., Norfolk, Va.

Representing

Barber-Greene Co.—Conveyors, Loaders, Ditchers, Blacktop Mixers, Finishers

Heltzel Steel Form & Iron Co.—Steel Rd. Forms, Curb & Gutter Forms, Aggregate Bins, Bulk Cement Bins, etc.

Flexible Road Joint Machine Co.—Concrete Flexplane Finishers, Joint Machines

Fate-Root-Heath Co.—Plymouth line of Internal Combustion and Diesel Electric Locomotives

HIGHWAY MACHINERY AND SUPPLY CO., INC.

1724 Altamont Ave. Richmond, Va.

Representing

Aeroil Burner Co., Inc.
Austin-Western Road Machy. Co.
Buckeye Traction Ditcher Co. (Tractor Equip.)
Burch Corp.
C. H. & E. Mfg. Co.
Chicago Automatic Conveyor Co.
Cleveland Formgrader Co.
Cleveland Tractor Co.
DeSoto Foundry Co.
W. E. Grace Mfg. Co.
Gray Co.
Heil Co.
Independent Pneumatic Tool Co.
A. Leschen & Sons Rope Co.
Murphy Diesel Co.
Northwest Engrg. Co.
Owen Bucket Co.
Ransome Machy. Co.
White Mfg. Co.
Worthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

PHILLIPS MACHINERY CO.

900 East Cary St. Richmond, Va.

Representing

Aeroil Burner Co., Inc.
Austin Machinery Corp.
Broderick & Bascom Rope Co.
Butler Bin Co.
Chain Belt Co.
Cleveland Trencher Co.
Clyde Iron Wks., Inc.
Concrete Surf. Machy. Co.
Independent Pneu. Tool Co.
Jackson Mfg. Co.
Jones Superior Mach. Co.
Manitowoc Engineering Wks.
Master Vibrator Co.
Owen Bucket Co.
Page Engineering Co.
Rogers Brothers Corp.
Sasgen Derrick Co.
Sauerman Brothers, Inc.
Skilsaw, Inc.
Vulcan Iron Works
Walker-Turner Co.

Member: Associated Equipment Distributors

STAR MACHINERY CO.

1741 First Ave., South Seattle, Wash.

Representing

Advance Machine Co.
Air Reduction Sales Co.
American Hoist & Derrick Co.
American-Marsh Pumps, Inc.
Beebe Brothers, Inc.
Chain Belt Co.
C. H. & E. Mfg. Co.
DeVilbiss Co.
DeWalt Products Corp.
Garlinghouse Bros.
Gordon Smith, Inc.
Hercules Motors Corp.
Independent Pneu. Tool Co.
Master Vibrator Co.
Oster Mfg. Co.
Red Star Mfg. Co.
Reed-Prentice Corp.
John A. Roebling's Sons Co.
Whiteman Mfg. Co.
Wellman Engrg. Co.
Wisconsin Motor Corp.
Witte Engine Corp.
Worthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

CONSTRUCTION EQUIPMENT CO.

1118-1124 Ide Ave., Spokane, Wash.

Aeroil Burner Co., Inc.
Archer Iron Works
Bates Wire Ties
Beebe Bros.
Blystone Mfg. Co.
Broderick & Bascom Rope
Bucyrus-Erie Co.
Buffalo-Springfld. Roller Co.
Butler Bin Co.
Chain Belt Co.
Climax Eng. Co.
Concrete Surf. Machy. Co.
D-A Lubricant Co.
Detroit Graphite Co.
R. E. Dietz Co.
Duff-Norton Mfg. Co.
Fairbanks, Morse & Co.
Fate-Root-Heath Co.
Homestead Valve Mfg. Co.
Kalamazoo Ry. Supply Co.
LeRoi Co.
The Linde Air Products Co.
M. & M. Wire Clamp Co.
Mall Tool Co.
Niagara Mfg. Co.
Red Star Products Co.
Sasgen Derrick Co.
Sheldon Mfg. Co.
Sterling Machinery Corp.
Sterling Wheelbarrow Co.
Sullivan Machinery Co.
Sunbeam Mfg. Co.
Templeton, Kenly & Co.
Willamette Hyster Co.
"Williams" Buckets, etc.
Young Iron Works

Member: Associated Equipment Distributors

ALAMO IRON WORKS

San Antonio Texas

Koehring shovels, cranes, mixers, pavers, dumptors, etc.
Insley shovels, cranes, wagons, concr. buckets, etc.
Kwik-Mix mixers
Parsons ditchers, backfillers
Gardner-Denver compressors, paving breakers, drills
Teismith quarry plant, sand and gravel plant equipment
Orr & Sembower hoists, boilers
Haiss loaders, conveyors
Johnson batchers, bins, bulk cement plants
Thor pneumatic tools
Red Star wheelbarrows, multiplex saws
C.H. & E. saw rigs
Gorman-Rupp pumps
Timken rock bits
Black & Decker electric drills, hammers, portable electric saws
Bethlehem wire rope
Cleaver Brooks tank car heaters, boosters
Onan generating plants
Master vibrators, generators
Williams clamshell buckets
Page dragline buckets
Hendrix dragline buckets
Delta woodworking machinery
Universal form clamps
Macleod asphalt heaters
Sidney woodworking machinery
Hotchkiss steel road forms
Wood shovels, scoops

NAGLE-HART TRACTOR & EQUIPMENT CO.

Eau Claire Madison Milwaukee
Wisconsin

Representing

ATHEY MobilLoaders, Trailers, Cranes
CATERPILLAR Tractors, Motor Graders, Diesel Engines, Marine Engines, Electric Sets
D-A LUBRICANT Oil and Grease
DAVENPORT BESLER-FRINK Snow Plows
DIAMOND Rock, Sand, Gravel Crushing; Screening, Washing Equipment
ETNYRE Asphalt Distributors
HUBER Rollers
LaPLANT CHOATE Bulldozers, Trailbuilders, Snow Plows, Scrapers
LeTOURNEAU Scrapers, Tournapulls, Bulldozers, Angledozers, Rooters, Cranes, Sheepsfoot Rollers
LESCHEN Wire Rope
MacWHYTE Wire Rope
MARTIN Trailers
TRACKSON Trackavators, Pipelayers
UNIVERSAL Light Plants
WILLAMETTE HYSTER Winches, Hoists, Cranes, Logging Equipment

Member: Associated Equipment Distributors

BOEHCK EQUIPMENT CO.

2404 W. Clybourn St. Milwaukee, Wis.

Representing

American Hoist & Derrick Co.
Byers Machine Co.
Caine Steel Co.
Centaur Co.
Concrete Surfacing Machy. Co.
Electric Tam. & Equip. Co.
Hauck Mfg. Company
Hercules St. Products Co.
Iowa Manufacturing Co.
Independent Pneumatic Tool Co.
Jaeger Machine Co.
C. S. Johnson Company
Jones-Superior Machine Co.
LeRoi Co.
A. Leschen & Sons Rope Co.
Lima Locomotive Works
McKiernan-Terry Corp.
N. P. Nelson Iron Wks., Inc.
Portable Machinery Company
Red Star Products, Inc.
Rogers Bros. Corp.
Sasgen Derrick Co.
Superior Concrete Accessories, Inc.
Union Fork & Hoe Co.
Walker-Turner Co., Inc.
Wellman Engineering Co.

Member: Associated Equipment Distributors

CUNNINGHAM-ORTMAYER CO.

429 W. Michigan St. Milwaukee, Wis.

Butler Bins, Batchers
Case Tractors and Mowers
Cleveland Formgrader Paving Equipment
Coffing Hoists
Calcium Chloride "Dowflake"
"Danos" Salamanders
Flexible Road Joint Machines
Galion Graders, Rollers and Spreaders
Good Roads Snow Plows
Gorman-Rupp Pumps
Gruendler Crushers and Pulverizers
Handlan 100-Hour Lantern, Torches
Heltzel Steel Road Forms
Ingersoll-Rand Air Compressors, Tools
Insley Power Shovels, Conc. Towers & Buckets
Koehring Mixers, Pavers, Shovels, Dumptors
Kwik-Mix Concrete and Bituminous Mixers
Littleford Distributors, Tar Kettles, Heaters
Multiplex Conc. Block Eq.
Omaha Dragline Buckets
Owen Clamshell Buckets, Grapples
Parsons Trenchers
Roeth Conc. Vibrators
Ruddomatic Taglines
Smith Truckmixers
Sterling Wheelbarrows
Wenzel Tarpaulins
Wire Rope Corp. of America

Member: Associated Equipment Distributors

DROTT TRACTOR CO., INC.

Milwaukee Wisconsin

Representing

Allis-Chalmers Tractors, Graders, Speed Patrols, Hauling and Power Units
Baker Bulldozers, Gradebuilders, Snow Plows, etc.
Century Graders
Drott Equipment (Hi-Way Service Corp.) Angledozers, Bulldozers, Tractor and Snow Plow Equipment, etc.
Gar Wood Scrapers, Rippers, etc.
General Motors—Diesel Engines for Power Units, Replacement Engines for Trucks and Shovels
Gunnison Flushers
Haiss Gravel and Snow Loading Equipment, Conveyors, etc.
Hauck Portable Kettles
Hercules Rollers
Highway Trailer Earth Boring Machines
Hough Sweepers, Shovels
Hughes-Keenan Tractor Cranes
Jacobsen Mowers
La Crosse Trailers
Oshkosh Trucks
Pacific Car & Fdry Hoists, Yarders
Pioneer Conveyors, Gravel & Rock Crushing Eq., etc.
Quincy Compressors
Rogers Mowers
Russell Rd. Equip. Scrapers, Rooters, etc.
Seaman Pulvi-Mixers
"Silent Hoist" Cranes
Thew Shovels, Cranes, Motor-Cranes
Tulsa Tractor Winches
Wausau Snow Plows

Member: Associated Equipment Distributors

HUNTER TRACTOR & MACHY. CO.

327 So. 16th St. Milwaukee, Wis.

Exclusive Distributors

Aeroil Burner Co.
American Steel & Wire Co.
Baroo Mfg. Co.
Bates Valve Bag Corp.
Beebe Bros.
Blaw-Knox Co.
Buckeye Tr. Ditcher Co.
Buffalo Sp'g'fld Roller Co.
Chain Belt Company
Clyde Iron Works, Inc.
Dempster Bros., Inc.
Kelley Electric Mach. Co.
Master Vibrator Co.
Northwest Engrg. Co.
R-B Equipment Co.
Sasgen Derrick Co.
Sauerman Bros., Inc.
Silent Hoist Winch & Cr. Co.
Sullivan Machy. Co.
Syntron Co.
Universal Form Clamp Co.
Vapor Blast Mfg. Co.
Vulcan Iron Works
Wenzel Tent & Duck Co.

Member: Associated Equipment Distributors

INDEX TO ADVERTISING

Aeroil Burner Co., Inc. 27
Agerstrand Corp. 9
Allis-Chalmers Mfg. Co. 9
American Cable Division 21
American Steel Scraper Co. 44
Ariens Co. 52
Armco Drainage Products Assn. 60
Austin-Western Road Machy. Co. 41
Baily Vibrator Co. 20
Barber-Greene Co. 46
Bartlett Mfg. Co. 41
Beebe Bros. 26
Bethlehem Steel Co. 40
Blackhawk Mfg. Co. 59
Blaw-Knox Division 15
Brooks Equip. & Mfg. Co. 57
Buckeye Traction Ditcher Co. 32
Bucyrus-Erie Co. 45
Buffalo-Springfield Roller Co. 56
Butler Bin Co. 50
Carey Co., Philip, The 23
Carver Pump Co. 55
Case Co., J. I. 23
C. H. & E. Mfg. Co. 27
Chicago Pneumatic Tool Co. 47
Cleaver-Brooks Co. 29
Cleveland Rock Drill Co., The 51
Cleveland Tractor Co. 37
Clyde Iron Works, Inc. 42
Complete Machy. & Equip. Co., Inc. 19
Connery Construction Co. 49
Construction Machy. Co. 30
Daniels, Inc., C. R. 45
Davenport Besler Corp. 33
DeSoto Foundry, Inc. 57
Electric Tamper & Equip. Co. 55
Etnyre & Co., E. D. 58
Euclid Road Machy. Co. 31
Fiske Bros. Refining Co., Lubriplate Div. 24
Flexible Road Joint Mach. Co. 21
Fulton Bag & Cotton Mills 38
Galion Iron Works & Mfg. Co. 63
Gardner-Denver Co. 33
Geerpres Wringer, Inc. 57
General Motors—Diesel Engine Div. 20
Goodall Rubber Co., Inc. 62
Griffin Wellpoint Corp. 28
Haiss Mfg. Co., George 62
Hayward Co., The 48
Heil Co., The 26
Hercules Co. 25
Hercules Steel Products Co. 14
Hetherington & Berner Inc. 11
Hobart Bros. 63
Howe-Simpson, Inc. 17
Iowa Mfg. Co. 12, 13
Jaeger Machine Co., The 39
Kinney Mfg. Co. 22
Koehring Co. 17
Laclede Steel Co. 62
LaCrosse Trailer & Equip. Co. 32
LeTourneau, Inc., R. G. 5
Lidgerwood Mfg. Co. 46
Lincoln Hotel 64
Link-Belt Speeder Corp. 27
Linn Mfg. Co. 54
Lister-Blackstone, Inc. 33
Littleford Bros. 36
Madsen Iron Works 61
Mall Tool Co. 56
Marion Steam Shovel Co. 49
Marlow Pumps 10
Martin Machine Co. 47
Marvel Equipment Mfrs. Inc. 18
McCaffrey-Ruddock Tagline Corp. 54
McKiernan-Terry Corp. 36
Michigan Power Shovel Co. 63
Murphy-Diesel Co. 31
Novo Engine Co. 58
Owen Bucket Co., The 60
Parsons Co. 18
Pettibone Mulliken Corp. 48
Raybestos Division, The 19
Richmond Screw Anchor Co. 59
Robins Conveyors Inc. 18
Rodgers Hydraulic, Inc. 43
Roeth Vibrator Co. 39
Rogers Bros. Corp. 24
Rototiller, Inc. 44
Sand's Level & Tool Co. 53
Sasgen Derrick Co. 44
Schramm Inc. 61
Seaman Motors 16
Servicised Products Corp. 17
Sinclair Refining Co., (Inc.) 10
Smith Engineering Works 25
Standard Oil Co. (Calif.) 28
Standard Oil Co., Indiana 53
Slope-Meter Co. 29
Stang Corp., John W. 40
Sterling Machinery Corp. 29
Sterling Wheelbarrow Co. 54
Stoody Co. 52
Texas Co., The (asphalt) 3
Texas Co., The (lubricants) 6, 7
Thew Shovel Co. 8
Truscon Laboratories, Inc. 11
United Concrete Form Products Co. 37
Universal Engineering Corp. 22
Universal Power Corp. 42
Viber Co. 51
Vulcan Tool Mfg. Co. 40
Walter Motor Truck Co. 38
Warren-Knight Co. 16
Wellman Engineering Co., The 50
White Mfg. Co. 8
Wickwire Spencer Steel Co. 30
Williams Form Engineering Corp. 60
Williams Roofing Products Co. 14
Wisconsin Hotel 64
Wisconsin Motor Corp. 56

Contractors and Engineers Monthly

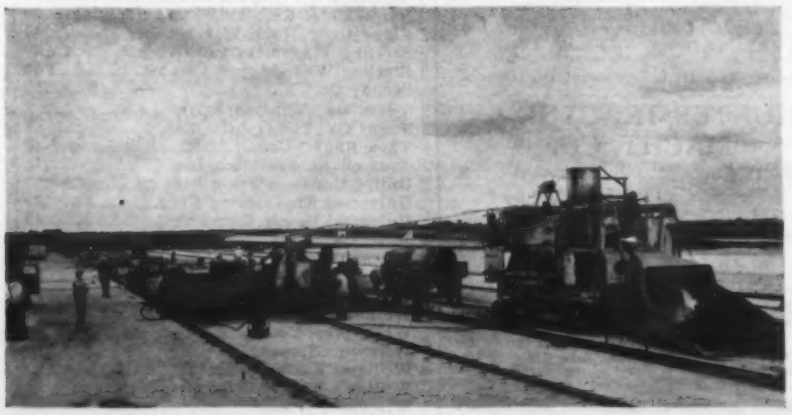
C. & E. M. Photos

Form work for the retaining walls for a depressed access road in Ohio. Left, plywood panels for the forms were swung into place and securely bolted; right, the high retaining walls required heavy well-built forms. **See page 2.**

C. & E. M. Photos

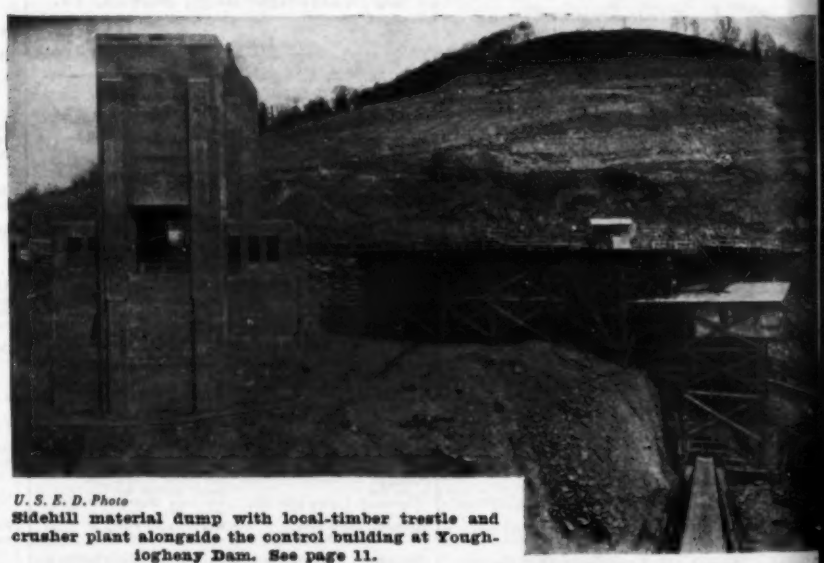
The piping hook-up for heating asphalt tank cars at a mountain-state Ordnance Depot and, at right, the two Roper asphalt pumps, valves and piping used to handle asphalt from tank car to storage and to the mixing plant. One pump was maintained as a stand-by. **See page 9.**

Gravel for surfacing this section of the Alcan Highway was produced by the Southern Minnesota Construction Co., of Spring Valley, Minn., at one of several borrow pits operated by that company, trucked to the road, spread by bulldozer, and bladed by power graders. **See page 19.**



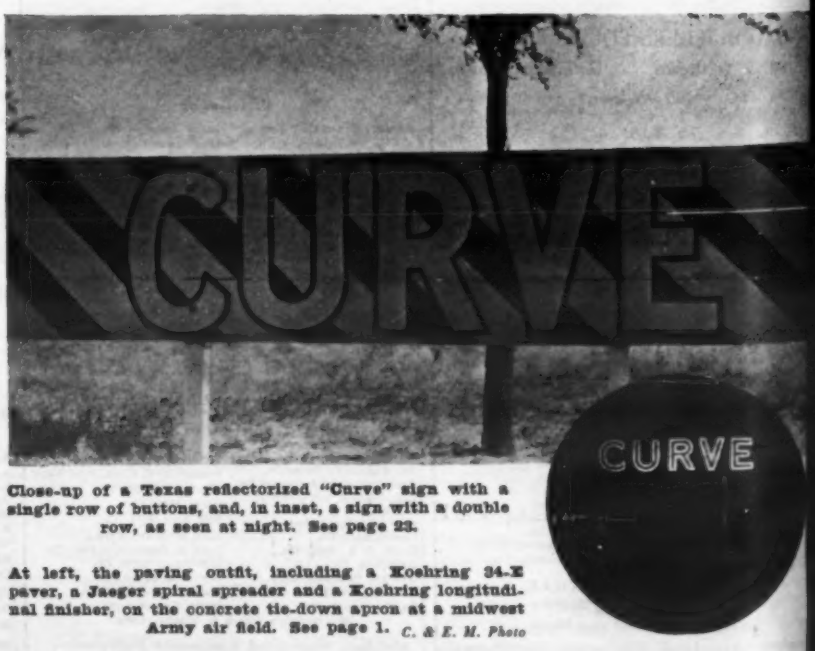
Pennsylvania Dept. of Highways Photos

Various species of pine, cedar and arborvitae form a natural snow fence in Pennsylvania. Views show a section in summer and another after a heavy blizzard in winter, with snow trapped by the planting. **See page 30.**



U. S. E. D. Photo

Sidehill material dump with local-timber trestle and crusher plant alongside the control building at Youghiogheny Dam. **See page 11.**



Close-up of a Texas reflectorized "Curve" sign with a single row of buttons, and, in inset, a sign with a double row, as seen at night. **See page 23.**

At left, the paving outfit, including a Koehring 34-E paver, a Jaeger spiral spreader and a Koehring longitudinal finisher, on the concrete tie-down apron at a midwest Army air field. **See page 1.** *C. & E. M. Photo*